2/9/8 (Item 8 from file: 2)
DIALOG(R)File 2:INSPEC

6657031 INSPEC Abstract Number: A2000-17-4283-013, B2000-09-4145-013
Title: Design, fabrication, and experiment of micromirror with aluminum pin-joints
Author(s): Chang-Hyeon Ji; Yong-Kweon Kim
Author Affiliation: Sch. of Electr. Eng., Seoul Nat. Univ., South Korea
Conference Title: 3rd International Conference on Micro Opto Electro Mechanical Systems (Optical MEMS). MOEMS 99. Proceedings p.44-8
Publisher: Inst. Mikrotechnik, Mainz, Germany
Publication Date: 1999 Country of Publication: Germany 273 pp.
Material Identity Number: XX-2000-01236
Conference Title: Proceedings of MOEMS 99
Conference Sponsor: Controlware; CSEM; Haas Laser; IOT Integrierte Optik Technol.; Schott; Siemens Electromech. Components; et al
Conference Date: 30 Aug.-1 Sept. 1999 Conference Location: Mainz, Germany
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
Abstract: This paper describes the design, fabrication and experiments of surface-micromachined micromirror array with hidden pin-joints. Instead of using elastic components, such as cantilevers and torsion hinges, we used pin-joint composed of pin and staples to support the mirror plate. The position of the pin-joint structure, under the mirror plate, makes large active surface area possible. Arrays of 100*110 mu m/sup 2/ sized micromirrors with two different staple shapes are designed and fabricated. These flexureless micromirrors are driven by electrostatic force between mirror plate and address electrode. As the mirror plate has discrete deflection angles, the device is well suited for applications where digital operation of mirror device is needed. Four-level metal structural layers and semi-cured photoresist sacrificial layers are used in the fabrication process. Polymeric sacrificial layers are removed by dry release process using **oxygen plasma** ashing. Static characteristics of the fabricated samples are measured and analyzed. (11 Refs)
Subfile: A B
Descriptors: micro-optics; micromachining; **micromechanical** devices; mirrors; optical design techniques; optical fabrication; photoresists
Identifiers: micromirror design; micromirror fabrication; aluminum pin-joints; surface-micromachined micromirror array; hidden pin-joints; elastic components; cantilevers; torsion hinges; mirror plate; pin-joint structure; large active surface area; flexureless micromirrors; electrostatic force; address electrode; discrete deflection angles; four-level metal structural layers; photoresist sacrificial layers; fabrication process; polymeric sacrificial layers; dry release process; **oxygen plasma** ashing; 100 mum; 110 mum; Al
Class Codes: A4283 (Micro-optical devices and technology); A4215E (Optical system design); A4280A (Optical lenses and mirrors); A4285D (Optical fabrication, surface grinding); A0710C (Micromechanical devices and systems); B4145 (Micro-optical devices and technology); B2575F (Fabrication of micromechanical devices)
Chemical Indexing:
Al el (Elements - 1)
Numerical Indexing: size 1.0E-04 m; size 1.1E-04 m

2/9/9 (Item 9 from file: 2)
DIALOG(R)File 2:INSPEC

6620234 INSPEC Abstract Number: A2000-14-6146-014
Title: Fabrication of a nanostructured diamond honeycomb film
Author(s): Masuda, H.; Watanabe, M.; Yasui, K.; Tryk, D.; Rao, T.; Fujishima, A.
Author Affiliation: Dept. of Appl. Chem., Tokyo Metropolitan Univ., Japan

the unique properties, deposition and etching techniques make fluorocarbon thin films a promising tool for micromachining; a number of applications are discussed and demonstrated. (16 Refs)
Subfile: B
Descriptors: aluminium; etching; integrated circuit technology; masks; **micromechanical** devices; organic compounds; polymer films; sputter etching ; sputtered coatings
Identifiers: fluorocarbon polymers; micromechanics; micromachining; thin-film deposition; etching; polymer fluorocarbon; thin-film properties; deposition; reactive ion etcher; carbonhydrotrifluoride plasma; step coverage; deposited thin films; conformal step coverage; Al oxide evaporated mask; Al/sub 2/O/sub 3/; O/sub 2/; N/sub 2/; SF/sub 6/
Class Codes: B0560 (Polymers and plastics); B0520 (Thin film growth); B7230 (Sensing devices and transducers); B2550E (Surface treatment); B2570 (Semiconductor integrated circuits)
Chemical Indexing:
Al2O3 bin - Al2 bin - Al bin - O3 bin - O bin (Elements - 2)
O2 el - O el (Elements - 1)
N2 el - N el (Elements - 1)
SF6 bin - F6 bin - F bin - S bin (Elements - 2)

2/9/19 (Item 19 from file: 2)
DIALOG(R)File 2:INSPEC

04380778 INSPEC Abstract Number: B9305-2550E-053
Title: Process optimization of free-standing polysilicon microstructures
Author(s): Kovacs, A.; Stoffel, A.
Author Affiliation: Inst. fur Innovation und Transfer, Furtwangen, Germany
Journal: Journal of Micromechanics and Microengineering vol.2, no.3 p.190-2
Publication Date: Sept. 1992 Country of Publication: UK
CODEN: JMMIEZ ISSN: 0960-1317
U.S. Copyright Clearance Center Code: 0960-1317/92/030190+03$07.50
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: Polycrystalline silicon (polysilicon) microstructures can be fabricated on silicon substrates by etching an underlying oxide layer (sacrificial layer). The maximum free-standing length of surface **micromechanical** structures is very sensitive to process details, such as the polysilicon deposition parameters, the doping process, the anneal conditions and the underetching and rinse procedures. For undoped and phosphorus doped polysilicon microstructures the value of strain was determined by buckling criteria. To avoid sticking of the polysilicon microstructures to the underlying surface after removal of the sacrificial layer a photoresist support layer and a subsequent **oxygen plasma** strip process were applied and optimized. For each polysilicon and sacrificial layer thickness the proper photoresist/acetone mixture as well as the dry underetching procedure was determined. (6 Refs)
Subfile: B
Descriptors: elemental semiconductors; etching; **micromechanical** devices ; photoresists; silicon
Identifiers: process optimisation; elemental semiconductor; free-standing polysilicon microstructures; etching; underlying oxide layer; sacrificial layer; surface **micromechanical** structures; buckling criteria; photoresist support layer; plasma strip process; dry underetching procedure; Si
Class Codes: B2550E (Surface treatment); B2550G (Lithography); B7230 (Sensing devices and transducers)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Si int - Si el (Elements - 1)

2/9/20 (Item 20 from file: 2)
DIALOG(R)File 2:INSPEC

04164455 INSPEC Abstract Number: B9207-2550E-036

Title: Deep dry etching techniques as a new IC compatible tool for silicon micromachining

Author(s): Linder, C.; Tschan, T.; de Rooij, N.F.

Author Affiliation: Inst. of Microtechnol., Neuchatel Univ., Switzerland

Conference Title: TRANSDUCERS '91. 1991 International Conference on Solid-State Sensors and Actuators. Digest of Technical Papers (Cat. No.91CH2817-5) p.524-7

Publisher: IEEE, New York, NY, USA

Publication Date: 1991 Country of Publication: USA 1089 pp.

ISBN: 0 87942 585 7

U.S. Copyright Clearance Center Code: 91CH2817-5/91/0000-0524$01.00

Conference Sponsor: IEEE; Cerberus; Endress & Hauser; Ford; General Motors; Hewlett-Packard

Conference Date: 24-27 June 1991 Conference Location: San Francisco, CA, USA

Language: English Document Type: Conference Paper (PA)

Treatment: Applications (A); Practical (P)

Abstract: Deep dry etching of single-crystal silicon with IC-compatible masking materials for microstructure fabrication is reported. Reactive ion etching using chlorine/fluorine gases and positive photoresist mask produces up to 30 mu m deep silicon steps with vertical sidewalls. **Plasma** etching with fluorine/ **oxygen** gas mixtures shows rather isotropic etch behavior; however, high selectivities of 20, 85, and greater than 300 for photoresist, silicon dioxide, and aluminum masks, respectively, permit etch depths of up to several hundreds of microns. Since these dry etching techniques are reproducible and controllable they indicate favorable features for application in silicon micromachining. Several examples are described: bipolar-compatible accelerometers where dry etching and KOH etching are combined, free-standing thin film microstructures (out of aluminum or silicon dioxide) realized by isotropic etching of the substrate, and thin silicon membranes fabricated by plasma etching. (6 Refs)

Subfile: B

Descriptors: accelerometers; elemental semiconductors; etching; integrated circuit technology; masks; **micromechanical** devices; photoresists; silicon; sputter etching

Identifiers: deep dry etching; plasma etching; IC technology; C/sub 2/ClFs/SF/sub 6/; reactive ion etching; Si membranes; micromachining; microstructure fabrication; isotropic etch; bipolar-compatible accelerometers; thin film microstructures; Si; SiO/sub 2/; Al mask; F-O/sub 2/; KOH etching; SF/sub 6/-O/sub 2/

Class Codes: B2550E (Surface treatment); B7230 (Sensing devices and transducers); B2570 (Semiconductor integrated circuits); B2550G (Lithography)

Chemical Indexing:

Si int - Si el (Elements - 1)

SiO2 int - O2 int - Si int - O int - SiO2 bin - O2 bin - Si bin - O bin (Elements - 2)

Al int - Al el (Elements - 1)

FO2 bin - O2 bin - F bin - O bin (Elements - 2)

KOH ss - OH ss - H ss - K ss - O ss (Elements - 3)

SF6O2 ss - F6 ss - O2 ss - F ss - O ss - S ss (Elements - 3)

2/9/21 (Item 21 from file: 2)

DIALOG(R)File 2:INSPEC

02532360 INSPEC Abstract Number: B85055715

Title: Resist materials utilizing oxygen plasma **resistance of iodine compounds**

Author(s): Ueno, T.; Shiraishi, H.; Iwayanagi, T.; Nonogaki, S.

Author Affiliation: Central Res. Lab., Hitachi Ltd., Tokyo, Japan

Journal: Journal of the Electrochemical Society vol.132, no.5 p.

6717304 INSPEC Abstract Number: A2000-21-8160C-030, B2000-11-2575F-015

Title: Fabrication of micromechanical structures in silicon using SF/sub 6//O/sub 2/ gas mixtures

Author(s): Paul, A.K.; Dimri, A.K.; Mohan, S.
Author Affiliation: Central Sci. Instrum. Organ., Chandigarh, India

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.3903 p.2-8
Publisher: SPIE-Int. Soc. Opt. Eng,
Publication Date: 1999 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(1999)3903L.2:FMSS;1-9
Material Identity Number: C574-2000-015
U.S. Copyright Clearance Center Code: 0277-786X/99/$10.00
Conference Title: Indo-Russian Workshop on Micromechanical Systems
Conference Sponsor: SPIE; Defence Res. & Dev. Organ.; Council of Sci. & Ind. Res.; Indian Space Res. Organ.; et al
Conference Date: 2-4 Feb. 1999 Conference Location: New Delhi, India
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Applications (A); Practical (P); Experimental (X)

Abstract: Plasma etching has been used for the fabrication of **micromechanical** structures in silicon with fine feature size. In this paper, reactive ion etching (RIE) is used for micromachining applications in two steps, first for etching of the SiO/sub 2/ layer and then machining of silicon. The first RIE step is for the patterning of the SiO/sub 2/ layer using a photo-resist as mask. This process involves the use of a gas mixture of CHF/sub 3/ and Ar. The photo-resist is then removed in the **oxygen plasma** . The second step is to delineate the patterned SiO/sub 2/ layer onto the silicon wafer using SF/sub 6//O/sub 2/ **plasma** . The **oxygen** flow is varied from 2-10 sccm in SF/sub 6/. Silicon etch rates of 195 nm/min and Si/SiO/sub 2/ selectivity of 10:1 has been obtained. The process parameters such as gas flow, rf-power and etch pressure are optimized as per our reactor's configuration to have compromise for best selectivity, anisotropy, and high etch rates. A pattern transfer with nearly vertical walls is obtained for RIE based on SF/sub 6//O/sub 2//CHF/sub 3/ while maintaining the substrate at low temperature. (15 Refs)

Subfile: A B
Descriptors: elemental semiconductors; masks; micromachining; photoresists; reaction rate constants; semiconductor-insulator boundaries; silicon; silicon compounds; sputter etching; surface chemistry
Identifiers: fabrication; **micromechanical** structures; silicon; SF/sub 6//O/sub 2/ gas mixtures; plasma etching; fine feature size; reactive ion etching; micromachining applications; SiO/sub 2/ layer; patterning; photo-resist mask; gas mixture; oxygen flow; etch rates; Si/SiO/sub 2/ selectivity; gas flow; rf-power; etch pressure; anisotropy; pattern transfer; vertical walls; -25 C; SF/sub 6/; O/sub 2/; Si; Si-SiO/sub 2
Class Codes: A8160C (Surface treatment and degradation in semiconductor technology); A5275R (Plasma applications in manufacturing and materials processing); A8220P (Measurements of chemical rate constants, reaction cross sections, and activation energies); A8265J (Heterogeneous catalysis at surfaces and other surface reactions); A8240Q (Plasma reactions); B2575F (Fabrication of micromechanical devices); B2520C (Elemental semiconductors) ; B2550E (Surface treatment (semiconductor technology)); B2550G (Lithography (semiconductor technology))
Chemical Indexing:
SF6 bin - F6 bin - F bin - S bin (Elements - 2)
O2 el - O el (Elements - 1)
Si sur - Si el (Elements - 1)
Si-SiO2 int - SiO2 int - O2 int - Si int - O int - SiO2 bin - O2 bin - Si bin - O bin - Si el (Elements - 1,2,2)
Numerical Indexing: temperature 2.48E+02 K

2/9/14 (Item 14 from file: 2)
DIALOG(R)File 2:INSPEC

5454291 INSPEC Abstract Number: B9702-2575-019
Title: A novel method to avoid sticking of surface-micromachined structures
Author(s): Kozlowski, F.; Lindmair, N.; Scheiter, T.; Hierold, C.; Lang, W.
Author Affiliation: Fraunhofer Inst. for Solid State Technol., Munich, Germany
Journal: Sensors and Actuators A (Physical) Conference Title: Sens. Actuators A, Phys. (Switzerland) vol.A54, no.1-3 p.659-62
Publisher: Elsevier,
Publication Date: June 1996 Country of Publication: Switzerland
CODEN: SAAPEB ISSN: 0924-4247
SICI: 0924-4247(199606)A54:1/3L.659:NMAS;1-R
Material Identity Number: N866-96010
U.S. Copyright Clearance Center Code: 0924-4247/96/$15.00
Conference Title: International Solid-State Sensors and Actuators Conference - TRANSDUCERS '95
Conference Date: 25-29 June 1995 Conference Location: Stockholm, Sweden
Document Number: S0924-4247(96)01156-9
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: Surface-micromachined cantilevers and bridges of 500 nm polysilicon on 900 nm thermal oxide as the sacrificial layer have been fabricated. It is well known that the released structures tend to stick to the substrate during the drying period after the oxide etching in HF and the rinse process. In general it is necessary to solidify the liquid between the polysilicon and the substrate. Thus we have replaced the HF by the monomer divinylbenzene in successive exchange steps. The monomer is polymerized under ultraviolet light at room temperature. Finally the polymer is released in an **oxygen plasma** . To prevent the fabricated structures from sticking to the substrate after an accidental touch during operation, bumps have been built under the polysilicon structures to keep them at a distance from the substrate. (15 Refs)
Subfile: B
Descriptors: elemental semiconductors; etching; micromachining; **micromechanical** resonators; microsensors; polymerisation; silicon
Identifiers: surface-micromachined structures; micromachined cantilevers; micromachined bridges; sticking avoidance method; polysilicon; thermal oxide sacrificial layer; oxide etching; divinylbenzene monomer; polymerized under ultraviolet light; antisticking with polymerization; modified resist process; freestanding structures; fluorocarbon bumps; 500 nm; 900 nm; Si
Class Codes: B2575 (Micromechanical device technology); B2550E (Surface treatment for semiconductor devices)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Si int - Si el (Elements - 1)
Numerical Indexing: size 5.0E-07 m; size 9.0E-07 m

2/9/15 (Item 15 from file: 2)
DIALOG(R)File 2:INSPEC

5432303 INSPEC Abstract Number: B9701-2550G-031
Title: Wet silylation and oxygen plasma **development of photoresists: A mature and versatile lithographic process for microelectronics and** microfabrication
Author(s): Gogolides, E.; Tzevelekis, D.; Grigoropoulos, S.; Tegou, E.;

Electrostatic devices); B8380M (Microactuators); B1310 (Waveguides and striplines)
Chemical Indexing:
GaAs sur - As sur - Ga sur - GaAs bin - As bin - Ga bin (Elements - 2)
Au int - Au el (Elements - 1)
Al int - Al el (Elements - 1)
Numerical Indexing: frequency 1.0E+08 to 1.8E+10 Hz; loss 5.0E-01 dB

2/9/13 (Item 13 from file: 2)
DIALOG(R)File 2:INSPEC

5796331 INSPEC Abstract Number: B9802-2550G-047
Title: Air-bridges, air-ramps, planarization, and encapsulation using pyrolytic photoresist in the fabrication of three-dimensional microstructures
Author(s): Porkolab, G.A.; Chen, Y.J.; Tabatabaei, S.A.; Agarwala, S.; Johnson, F.G.; King, O.; Dagenais, M.; Frizzell, R.E.; Beard, W.T., Jr.; Stone, D.R.
Author Affiliation: Dept. of Comput. Sci. & Electr. Eng., Maryland Univ., Baltimore, MD, USA
Journal: Journal of Vacuum Science & Technology B (Microelectronics and Nanometer Structures) vol.15, no.6 p.1961-5
Publisher: AIP for American Vacuum Soc,
Publication Date: Nov.-Dec. 1997 Country of Publication: USA
CODEN: JVTBD9 ISSN: 0734-211X
SICI: 0734-211X(199711/12)15:6L.1961:BRPE;1-1
Material Identity Number: C067-97011
U.S. Copyright Clearance Center Code: 0734-211X/97/15(6)/1961/5/$10.00
Document Number: S0734-211X(97)06506-2
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: Pyrolyzation of photolithographically patterned photoresist on semiconductor substrates such as silicon, gallium arsenide, and indium phosphide, results in a convex-shaped, chemically inert, temporary form that functions as a mold upon which to lift-off evaporated thin films such as metals. The pyrolyzation process is simply a bake on a standard laboratory hot-plate that is ramped from room temperature to 300 degrees C air. The pyrolytic-photoresist form is subsequently removed in an **oxygen plasma** stripper leaving behind the three-dimensional lifted off thin films of free-standing, convex-shaped, full-arch air-bridges or half-arch air-bridges that we call air-ramps. Some applications are interconnects for high-speed devices; inter-level interconnects; out-of-plane coils for out-of-plane inductors; microdomes for electromagnetic shielding; electrodes for field-emitter tips; and **microelectromechanical** structures. Pyrolyzing photoresist does not alter the good planarization capabilities of photoresist. Because pyrolytic photoresist is a version of the earliest form of synthetic thermoset resin called Bakelite, it can also be used as a reasonably good encapsulation material. (11 Refs)
Subfile: B
Descriptors: encapsulation; integrated circuit interconnections; **micromechanical** devices; nanotechnology; photoresists; pyrolysis
Identifiers: three-dimensional microstructures; fabrication; photolithographically patterned photoresist; semiconductor substrates; pyrolytic photoresist; convex-shaped form; chemically inert temporary form; evaporated thin film lift-off; air-bridges; air-ramps; planarization; encapsulation; plasma stripper; free-standing structures; high-speed device interconnects; interlevel interconnects; out-of-plane coils; out-of-plane inductors; microdomes; field-emitter tip electrodes; **microelectromechanical** structures; nanostructures; 20 to 300 C
Class Codes: B2550G (Lithography (semiconductor technology)); B0170J (Product packaging); B2550F (Metallisation and interconnection technology); B2575 (Micromechanical device technology)
Numerical Indexing: temperature 2.93E+02 to 5.73E+02 K

fabrication of interdigitated microelectrode arrays featuring a resolution of 2 mu m. The analytical performance of the interdigitated microelectrodes is illustrated by the detection of dopamine over a concentration range of 50 nM to 100 mu M. (Author abstract) 24 Refs.

Descriptors: *Microelectrodes; Sputter deposition; Thin films; Electrochemistry; Spectroscopic analysis; Surface treatment; Plasmas; Adhesion; Carbon; Silicon

Identifiers: Carbon thin films; Interdigitated microelectrode arrays (IDA); **Microfabrication**

Classification Codes:

801.4.1 (Electrochemistry)

462.1 (Biomedical Equipment, General); 813.1 (Coating Techniques); 802.3 (Chemical Operations); 801.4 (Physical Chemistry)

462 (Medical Engineering & Equipment); 813 (Coatings & Finishes); 802 (Chemical Apparatus & Plants); 801 (Chemical Analysis & Physical Chemistry)

46 (BIOENGINEERING); 81 (CHEMICAL PROCESS INDUSTRIES); 80 (CHEMICAL ENGINEERING)

2/9/35 (Item 13 from file: 8)

DIALOG(R)File 8:Ei Compendex(R)

7

04601784 E.I. No: EIP96103370479

Title: Characterization of residual stress in metallic films on silicon with micromechanical **devices**

Author: Boutry, Mathilde; Bosseboeuf, Alain; Coffignal, G.

Corporate Source: Univ. de Paris XI, Orsay Cedex, Fr

Conference Title: Micromachining and Microfabrication Process Technology II

Conference Location: Austin, TX, USA Conference Date: 19961014-19961015

Sponsor: SPIE - Int Soc for Opt Engineering, Bellingham, WA USA

E.I. Conference No.: 22643

Source: Proceedings of SPIE - The International Society for Optical Engineering v 2879 1996.. p 126-134

Publication Year: 1996

CODEN: PSISDG ISBN: 0-8194-2277-0

Language: English

Document Type: CA; (Conference Article) Treatment: X; (Experimental)

Journal Announcement: 9703W2

Abstract: Al and Cr cantilever microbeams, microbridges and suspended microrings were fabricated by isotropic etching of silicon with a SF//6/ o // 2 **plasma** after film patterning. They were used for the characterization of both compressive stress, extensive stress and stress gradients in the metallic films. It is shown that valid residual stress measurements with such **micromechanical** devices must take into account stress changes due to process fabrication, underetching at the clamped ends, edge effects and stress gradients. This is demonstrated by bucking threshold measurements of microbridges and microrings of various sizes and 3D finite element linear static and linear buckling analyses including underetching or stress gradients. Cantilever microbeam profile measurements shows that temperature rise during etching must be carefully minimizes to avoid thermally induced stress gradients. Stress gradients in the deposited films have no effect on microbridges critical buckling stress but lead to a distortion of the microrings before the occurrence of buckling. 14 Refs.

Descriptors: **Microelectromechanical** devices; Metallic films; Residual stresses; Semiconducting silicon; Characterization; Etching; Plasma devices ; Fabrication; Beams and girders

Identifiers: Cantilever microbeams; Microrings; Microbridges

Classification Codes:

712.1.1 (Single Element Semiconducting Materials)

714.2 (Semiconductor Devices & Integrated Circuits); 704.1 (Electric Components); 712.1 (Semiconducting Materials); 943.2 (Mechanical Variables Measurements); 932.3 (Plasma Physics)

714 (Electronic Components); 704 (Electric Components & Equipment); 712 (Electronic & Thermionic Materials); 943 (Mechanical & Miscellaneous

Optical Devices); 813 (Coatings & Finishes); 815 (Plastics & Polymeric Materials); 802 (Chemical Apparatus & Plants)
71 (ELECTRONICS & COMMUNICATIONS); 72 (COMPUTERS & DATA PROCESSING); 74 (OPTICAL TECHNOLOGY); 81 (CHEMICAL PROCESS INDUSTRIES); 80 (CHEMICAL ENGINEERING)

2/9/31 (Item 9 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05225773 E.I. No: EIP99020002808
Title: Design and fabrication of micromirror array with hidden joint structures
Author: Ji, Chang-Hyeon; Kim, Yong-Kweon
Corporate Source: Seoul Natl Univ, Seoul, South Korea
Conference Title: Proceedings of the 1998 Conference on Microelectronic Structures and MEMS for Optical Processing IV
Conference Location: Santa Clara, CA, USA Conference Date: 19980921-19980922
Sponsor: SPIE
E.I. Conference No.: 49723
Source: Proceedings of SPIE - The International Society for Optical Engineering v 3513 1998. SPIE, Bellingham, WA, USA. p 71-77
Publication Year: 1998
CODEN: PSISDG ISSN: 0277-786X
Language: English
Document Type: CA; (Conference Article) Treatment: X; (Experimental)
Journal Announcement: 9904W1
Abstract: This paper describes the design and fabrication of surface-micromachined micromirror array with hidden joint structures. Instead of using elastic spring components, such as cantilevers, flexure beams, and torsion hinges, we have used joint structure composed of pin and staples to support the mirror plate. The position of the joint structure, under the mirror plate, makes large active surface area possible. Arrays of 100 multiplied by 110 mu m**2 sized micromirrors with two different staple shapes are designed and fabricated. These flexureless micromirrors are driven by electrostatic force between mirror plate and address electrode under it. As the mirror plate has discrete deflection angles the device is well suited for spatial light modulating purpose. Four-level metal structural layers and semi-cured photoresist sacrificial layers are used in the fabrication process and sacrificial layers are removed by dry release process using **oxygen plasma**. Performance characteristics are measured by applying voltage difference between the ground electrode, which contacts the mirror plate via support post, and an address electrode. (Author abstract) 13 Refs.
Descriptors: Mirrors; **Microelectromechanical** devices; Micromachining; Electrostatics; Light modulation; Reactive ion etching
Identifiers: Microoptoelectromechanical systems (MOEMS)
Classification Codes:
741.3 (Optical Devices & Systems); 601.1 (Mechanical Devices); 704.1 (Electric Components); 604.2 (Machining Operations); 701.1 (Electricity: Basic Concepts & Phenomena)
741 (Optics & Optical Devices); 601 (Mechanical Design); 704 (Electric Components & Equipment); 714 (Electronic Components); 604 (Metal Cutting & Machining); 701 (Electricity & Magnetism)
74 (OPTICAL TECHNOLOGY); 60 (MECHANICAL ENGINEERING); 70 (ELECTRICAL ENGINEERING); 71 (ELECTRONICS & COMMUNICATIONS)

2/9/32 (Item 10 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05225742 E.I. No: EIP99020002778
Title: Wideband microwave switch by micromachining techniques
Author: Chang, Chienliu; Chang, Peizen; Yen, Kaihsiang; Lu, Shey-Shi

SYSTEM:OS - DIALOG OneSearch
File 2:INSPEC 1969-2002/Jun W2
(c) 2002 Institution of Electrical Engineers
File 8:Ei Compendex(R) 1970-2002/Jun W2
(c) 2002 Engineering Info. Inc.
File 144:Pascal 1973-2002/Jun W2
(c) 2002 INIST/CNRS

Set	Items	Description
	9054	MEMS
	16126	MICROMECHANICAL
	8444	MICROELECTROMECHANICAL
	6507	MICROFABRICAT?
	1261960	O
	5195144	2
	30733	O(W)2
	521352	OXYGEN
	677506	PLASMA
	7944	(O(W)2 OR OXYGEN)(3N)PLASMA
S1	58	(MEMS OR MICROMECHANICAL OR MICROELECTROMECHANICAL OR MICROFABRICAT?) AND (O(W)2 OR OXYGEN)(3N)PLASMA

?rd
...examined 50 records (50)
...completed examining records
S2 40 RD (unique items)
?t s2/full/all

2/9/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

7115713 INSPEC Abstract Number: B2002-01-2575F-038
Title: Patterning of diamond microstructures on Si substrate by bulk and surface micromachining
Author(s): Yongqing Fu; Hejun Du; Jianmin Miao; Yanju Liu
Author Affiliation: Sch. of Mech. & Production Eng., Nanyang Technol. Univ., Singapore, Singapore
Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.4230 p.164-9
Publisher: SPIE-Int. Soc. Opt. Eng,
Publication Date: 2000 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(2000)4230L.164:PDMS;1-E
Material Identity Number: C574-2001-084
U.S. Copyright Clearance Center Code: 0277-786X/00/$15.00
Conference Title: Micromachining and Microfabrication
Conference Sponsor: SPIE; Nanyang Technol. Univ
Conference Date: 28-30 Nov. 2000 Conference Location: Singapore
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Experimental (X)
Abstract: Diamond microstructures were patterned over silicon/silicon dioxide substrate using the processes combined with bulk or surface micromachining, selective growth of diamond and plasma etching technique. Polycrystalline diamond films were prepared using microwave plasma enhanced chemical vapor deposition (MW-PECVD) and a gas mixture of hydrogen and methane. (111)- and (100)-oriented diamond films were synthesized and smooth (100)-textured thin films were successfully deposited on silicon structures, such as trenches, corners, edges, forming a good heat-diffusing and insulating layer as well as a protective wear-resistant surface. Two types of techniques for precise patterning of diamond microstructures were investigated in this paper. The first one was to selectively grow diamond films in the desired region by pre-depositing a Pt interlayer on silicon dioxide layer. The second one was to selectively etch the deposited diamond film by **oxygen** /argon **plasma** under an Al mask. Different

microstructures, for example, diamond membrane, microgear, microrotor, comb drive structure, etc. were successfully fabricated. (9 Refs)
Subfile: B
Descriptors: diamond; micromachining; plasma CVD coatings; sputter etching
Identifiers: diamond microstructure; bulk micromachining; surface micromachining; silicon substrate; silicon dioxide substrate; selective growth; plasma etching; polycrystalline thin film; microwave plasma enhanced chemical vapor deposition; Pt interlayer; Al mask; membrane; microgear; microrotor; comb drive; **MEMS** technology; C; Si; SiO/sub 2/; Pt ; Al
Class Codes: B2575F (Fabrication of micromechanical devices); B0520F (Chemical vapour deposition); B2550E (Surface treatment (semiconductor technology))
Chemical Indexing:
C el (Elements - 1)
Si sur - Si el (Elements - 1)
SiO2 sur - O2 sur - Si sur - O sur - SiO2 bin - O2 bin - Si bin - O bin (Elements - 2)
Pt el (Elements - 1)
Al el (Elements - 1)

2/9/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

7034233 INSPEC Abstract Number: B2001-10-2575B-019
Title: Integration of sputtered silicon microstructures with pre-fabricated CMOS circuitry
Author(s): Horner, K.A.; Kovacs, G.T.A.
Author Affiliation: Stanford Univ., CA, USA
Journal: Sensors and Actuators A (Physical) Conference Title: Sens. Actuators A, Phys. (Switzerland) vol.A91, no.3 p.386-97
Publisher: Elsevier,
Publication Date: 15 July 2001 Country of Publication: Switzerland
CODEN: SAAPEB ISSN: 0924-4247
SICI: 0924-4247(20010715)A91:3L.386:ISSM;1-L
Material Identity Number: N866-2001-010
U.S. Copyright Clearance Center Code: 0924-4247/2001/$20.00
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Document Number: S0924-4247(01)00612-4
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: This paper describes a novel fabrication process for creating sputtered silicon microstructure similar to those commonly made using LPCVD polysilicon. Unlike the LPCVD polysilicon processes, however, this low-temperature sputtered process is compatible with pre-fabricated aluminum-metallized CMOS circuitry. Both polyimide and conventional oxide sacrificial layers were used, with the former being removed using **oxygen plasma** . This dry-release step eliminated the need for critical point drying commonly required for wet releases. To evaluate sputtered silicon for use in **MEMS** , several properties were investigated, including in-plane stress, strain gradient, density, surface roughness, electrical resistivity, and HF permeability. Tensile stress values lower than 100 MPa were achieved by varying the deposition parameters. Average strain gradients were an inverse square function of thickness. Densities were slightly lower than bulk silicon values. Surface roughness was less than 6 nm rms. The electrical conductivity of the silicon bare films was low but was increased by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS

transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. Finally, to demonstrate the technology, an electrostatically deflected plate structure was fabricated above a capacitance measurement circuit and performance results are presented. (27 Refs)

Subfile: B

Descriptors: capacitive sensors; CMOS integrated circuits; density; electrical resistivity; elemental semiconductors; internal stresses; **micromechanical** devices; microsensors; semiconductor thin films; silicon; sputter deposition; sputter etching; surface topography

Identifiers: sputtered silicon microstructures; pre-fabricated CMOS circuitry; low-temperature sputtered process; Al-metallized CMOS circuitry; polyimide sacrificial layers; oxide sacrificial layers; **oxygen plasma** ; dry-release step; **MEMS** ; in-plane stress; strain gradient; density; surface roughness; electrical resistivity; HF permeability; tensile stress; deposition parameters; electrical conductivity; silicon bare films; cladding; CMOS transistors; maximum saturation current; mechanical layer processing; electrostatically deflected plate structure; capacitance measurement circuit; Si-SiO/sub 2/; TiW

Class Codes: B2575B (Materials for micromechanical device technology); B2575F (Fabrication of micromechanical devices); B0520B (Sputter deposition); B2570D (CMOS integrated circuits); B2550E (Surface treatment (semiconductor technology)); B7230M (Microsensors)

Chemical Indexing:

Si-SiO2 int - SiO2 int - O2 int - Si int - O int - SiO2 bin - O2 bin - Si bin - O bin - Si el (Elements - 1,2,2)

TiW int - Ti int - W int - TiW bin - Ti bin - W bin (Elements - 2)

2/9/3 (Item 3 from file: 2)

DIALOG(R)File 2:INSPEC

7007177 INSPEC Abstract Number: B2001-09-2550G-040

Title: Heat-and oxygen-RIE-resistant polysiloxane resist with three-dimensional structure for high-aspect-ratio microfabrication

Author(s): Watanabe, K.; Igarashi, M.; Suda, S.

Author Affiliation: Fujitsu Labs. Ltd., Atsugi, Japan

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.4174 p.515-21

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 2000 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(2000)4174L.515:HORP;1-R

Material Identity Number: C574-2001-026

U.S. Copyright Clearance Center Code: 0277-786X/2000/$15.00

Conference Title: Micromachining and Microfabrication Process Technology VI

Conference Sponsor: SPIE

Conference Date: 18-20 Sept. 2000 Conference Location: Santa Clara, CA, USA

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Applications (A); Practical (P); Experimental (X)

Abstract: An organosiloxane resist, 3D structure polysiloxane, had been developed for use as a high resolution bi-layer resist for high-aspect-ratio **microfabrication** . The resist molecule is structured as a rigid 3D siloxane core surrounded by functional groups. The advantages of such a structure are lower degree of swelling, a high oxygen-reactive ion etching resistance, and a high softening temperature. A 100 nm line-and-space pattern is well-defined after electron beam exposure. The resist can be also used for UV lithography. Sub-half micron UV pattern with aspect-ratio or more than 10 can be delineated with the 3D structure siloxane/novolak bi-layer resist system after high density **oxygen plasma** etching. The novolak bottom layer is etched at about 1000 nm/min, and the

etching selectivity ratio is more than 20. The excellent etching resistance of the 3D siloxane is due to its high silicon content and good film quality. The softening temperature of the 3D siloxane is more than 400 degrees C, although ladder structure siloxane's softening temperature is 150 degrees C. This suggests the 3D siloxane resist exhibits high heat resistance due to its rigid structure. Bi-layer resist systems with the 3D siloxane show high resolution with high-aspect ratio, demonstrating its great potential for application in **microfabrication** process of electronic devices. (8 Refs)

Subfile: B

Descriptors: electron resists; photoresists; sputter etching; swelling; ULSI

Identifiers: polysiloxane resist; three-dimensional structure; high-aspect-ratio **microfabrication** ; organosiloxane resist; high resolution bi-layer resist; rigid 3D siloxane core; swelling; reactive ion etching resistance; softening temperature; line-and-space pattern; electron beam exposure; UV lithography; plasma etching; etching selectivity ratio; etching resistance; film quality; heat resistance; rigid structure; **microfabrication** process; 100 nm; 400 degC; 150 degC

Class Codes: B2550G (Lithography (semiconductor technology)); B2550E (Surface treatment (semiconductor technology)); B2570 (Semiconductor integrated circuits)

Numerical Indexing: size 1.0E-07 m; temperature 6.73E+02 K; temperature 4.23E+02 K

2/9/4 (Item 4 from file: 2)

DIALOG(R)File 2:INSPEC

6958903 INSPEC Abstract Number: A2001-15-0710C-002, B2001-08-2575F-009

Title: Miniaturized tin oxide (SnOx) sensor by using oxygen - plasma **-treated thin film technique**

Author(s): Kun Lian; Zhong Geng Ling; Jie Chao Jiang

Author Affiliation: Center for Adv. Microstruct. & Devices, Louisiana State Univ., Baton Rouge, LA, USA

Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.4077 p.518-25

Publisher: SPIE-Int. Soc. Opt. Eng,

Publication Date: 2000 Country of Publication: USA

CODEN: PSISDG ISSN: 0277-786X

SICI: 0277-786X(2000)4077L.518:MOSS;1-W

Material Identity Number: C574-2000-179

U.S. Copyright Clearance Center Code: 0277-786X/2000/$15.00

Conference Title: International Conference on Sensors and Control Techniques (ICSC 2000)

Conference Sponsor: SPIE; Chinese Soc. Instrum.; Chinese Soc. of Electron.; Wuhan Univ. of Technol.; Huazhong Univ. of Sci. & Technol

Conference Date: 19-21 June 2000 Conference Location: Wuhan, China

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Experimental (X)

Abstract: A new processing technique for thin film tin oxide gas sensor has been described in this paper. **Oxygen plasma** is used as film sensitizing tool, in which the temperature only goes up to 190 degrees C for a short time. By using this technique, the tin oxide thin film sensors with smooth, uniform surface have been made with a reasonable sensitivity to the CO gas at room temperature. The **oxygen plasma** treatment decreases both film resistivity and film grain size. This new technique makes the tin oxide sensor fabrication compatible with the microelectronic processing. (20 Refs)

Subfile: A B

Descriptors: carbon compounds; crystal microstructure; crystal morphology ; electric resistance; gas sensors; grain size; microsensors; oxygen; plasma materials processing; semiconductor materials; thin film devices;

tin compounds
Identifiers: SnOx miniature sensor; thin film gas sensor; O/sub 2/ plasma ; up to 190 degrees C; smooth uniform surface; sensitivity; CO gas detection; room temperature; film resistivity; film grain size; microelectronic processing; **MEMS** ; 190 C; SnO; CO
Class Codes: A0710C (Micromechanical devices and systems); A5275R (Plasma applications in manufacturing and materials processing); A6150J (Crystal morphology and orientation); A6480G (Microstructure); A8280T (Chemical sensors); B2575F (Fabrication of micromechanical devices); B7230M (Microsensors); B2220E (Thin film circuits); B7230L (Chemical sensors); B7320T (Chemical variables measurement)
Chemical Indexing:
SnO int - Sn int - O int - SnO bin - Sn bin - O bin (Elements - 2)
CO bin - C bin - O bin (Elements - 2)
Numerical Indexing: temperature 4.63E+02 K

2/9/5 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

6911426 INSPEC Abstract Number: B2001-06-2575B-002
Title: Sputtered silicon for integrated MEMS **applications**
Author(s): Honer, K.A.; Kovacs, G.T.A.
Author Affiliation: Center for Integrated Syst., Stanford Univ., CA, USA
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop (TRF Cat. No.00TRF-0001) p.308-11
Publisher: Transducers Res. Found, Cleveland, OH, USA
Publication Date: 2000 Country of Publication: USA xvi+376 pp.
ISBN: 0 9640024 3 4 Material Identity Number: XX-2000-01551
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Medium: Also available on CD-ROM in PDF format
Language: English Document Type: Conference Paper (PA)
Treatment: Applications (A); Experimental (X)
Abstract: This paper describes a new fabrication process for creating electrostatic microstructures that are compatible with prefabricated aluminum-metallized CMOS circuitry. The process uses sputtered silicon to make released microstructures similar to those commonly made using LPCVD polysilicon but does so at much lower temperatures (~350 degrees C). The low-temperature nature of sputter deposition makes it possible to use polyimide sacrificial layers that can be released in an **oxygen plasma** . This dry-release process eliminates the need for critical point drying or similar methods. Average strain gradients in released sputtered silicon cantilevers were found to vary with the inverse square of thickness. At a thickness of 5.0 mu m, the radius of curvature of released cantilevers was in excess of 80 mm. Improvements in the electrical conductivity of completed structures were realized by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. As a demonstration of the integratibility of the sputtered silicon process, electrostatically actuated variable-capacitors were fabricated above CMOS capacitance detection circuitry. (9 Refs)
Subfile: B
Descriptors: capacitors; electrostatic actuators; elemental semiconductors; semiconductor thin films; silicon; sputtered coatings
Identifiers: integrated **MEMS** device; fabrication; silicon microstructure; sputter deposition; dry release process; cantilever beam; electrical conductivity; strain gradient; radius of curvature; CMOS transistor; electrostatic actuator; variable capacitor; capacitance detection circuit; polyimide sacrificial layer; titanium-tungsten cladding; 350 C; Si; Ti-W

Class Codes: B2575B (Materials for micromechanical device technology); B2520C (Elemental semiconductors); B0520B (Sputter deposition); B5180D (Electrostatic devices); B8380M (Microactuators); B2130 (Capacitors)
Chemical Indexing:
Si el (Elements - 1)
TiW bin - Ti bin - W bin (Elements - 2)
Numerical Indexing: temperature 6.23E+02 K

2/9/6 (Item 6 from file: 2)
DIALOG(R)File 2:INSPEC

6911411 INSPEC Abstract Number: B2001-06-2575F-018, C2001-06-3260P-015
Title: A low power/low voltage electrostatic actuator for RF MEMS **applications**
Author(s): Yao, J.J.; Park, S.; Anderson, R.; DeNatale, J.
Author Affiliation: Sci. Center, Rockwell Int. Corp., Thousand Oaks, CA, USA
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop (TRF Cat. No.00TRF-0001) p.246-9
Publisher: Transducers Res. Found, Cleveland, OH, USA
Publication Date: 2000 Country of Publication: USA xvi+376 pp.
ISBN: 0 9640024 3 4 Material Identity Number: XX-2000-01551
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Medium: Also available on CD-ROM in PDF format
Language: English Document Type: Conference Paper (PA)
Treatment: Applications (A); Experimental (X)
Abstract: We have designed and fabricated a low power/low voltage electrostatic actuator, and demonstrated its application to a large tuning-ratio tunable capacitor for RF **MEMS** applications. Using adhesive bonding and deep silicon reactive ion etching techniques, the entire **MEMS** device is made of single crystal silicon, and is suspended over a glass substrate. A coat of aluminum is sputtered on after the dry release in an **oxygen plasma** to provide good electrical conductivity for the integrated RF devices. An electrostatic deflection of 23 mu m has been demonstrated with an applied voltage of 5.2 V, and has resulted in the tunable capacitor having a maximum continuous tuning ratio in excess of 4.5 to 1. Alternative devices with a required low tuning voltage of 3 V have also been demonstrated to provide a tuning ratio of 2 to 1. Power consumption of this actuator is linearly proportional to the actuation frequency, and is in the range of 10's of nano-Watts when the device is actuated at a frequency of a few kHz. (9 Refs)
Subfile: B C
Descriptors: adhesion; capacitors; electrostatic actuators; low-power electronics; sputter etching; tuning
Identifiers: electrostatic actuator; RF **MEMS** device; tuning ratio; tunable capacitor; adhesive bonding; deep reactive ion etching; low-power low-voltage operation; single crystal silicon; glass substrate; electrical conductivity; aluminum sputtered coating; 3 V; 5.2 V; Si; Al
Class Codes: B2575F (Fabrication of micromechanical devices); B8380M (Microactuators); B5180D (Electrostatic devices); B2130 (Capacitors); C3260P (Microactuators)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Al el (Elements - 1)
Numerical Indexing: voltage 3.0E+00 V; voltage 5.2E+00 V

2/9/7 (Item 7 from file: 2)
DIALOG(R)File 2:INSPEC

Journal: Advanced Materials vol.12, no.6 p.444-7
Publisher: VCH Verlagsgesellschaft,
Publication Date: 16 March 2000 Country of Publication: Germany
CODEN: ADVMEW ISSN: 0935-9648
SICI: 0935-9648(20000316)12:6L.444:FNDH;1-V
Material Identity Number: M606-2000-007
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: **Micromechanical** and electronic devices are a potential application for nanohoneycomb-structured diamond films, which were produced by **oxygen plasma** etching with porous anodic alumina films as masks to give highly ordered hexagonal hole arrays with high aspect ratios. The high refractive index and high transparency of these structures make them suitable for photonic bandgap materials. (25 Refs)
Subfile: A
Descriptors: alumina; diamond; nanostructured materials; refractive index ; scanning electron microscopy; sputter etching
Identifiers: nanostructure; diamond; honeycomb films; micromechanics; films; **oxygen plasma** etching; etching; porous films; anodic alumina; refractive index; transparency; bandgap; photonic materials; SEM; scanning electron microscopy; C
Class Codes: A6146 (Structure of solid clusters, nanoparticles, and nanostructured materials); A7820D (Optical constants and parameters (condensed matter)); A8120G (Preparation of metals and alloys (compacts, pseudoalloys))
Chemical Indexing:
C el (Elements - 1)

2/9/10 (Item 10 from file: 2)
DIALOG(R)File 2:INSPEC

6528571 INSPEC Abstract Number: A2000-08-0725-003, B2000-04-7320X-007
Title: Batch fabricated amperometric relative humidity sensor
Author(s): Ilic, B.; Neuzil, P.; Maclay, G.J.
Author Affiliation: Dept. of Electr. Eng. & Comput. Sci., Illinois Univ., Chicago, IL, USA
Conference Title: Proceedings of the Symposium on Microstructures and Microfabricated Systems IV p.140-7
Editor(s): Hesketh, P.J.; Hughes, H.; Bailey, W.E.
Publisher: Electrochem. Soc, Pennington, NJ, USA
Publication Date: 1998 Country of Publication: USA vii+269 pp.
ISBN: 1 56677 206 0 Material Identity Number: XX-1999-02006
Conference Title: Proceedings of the Symposium on Microstructures and Microfabricated Systems IV
Conference Date: 1-6 Nov. 1998 Conference Location: Boston, MA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
Abstract: Batch fabrication of planar amperometric gas sensors on alumina substrates has been developed for the measurement of relative humidity. The electrochemical cell consists of two electrodes and Nafion/sup TM/, a perfluorinated ion exchange polymer, as an electrolyte. A potential is applied between the working and the counter electrode and the resulting current is measured. The variation in current is mainly due to the conductivity modulation of the hydrated Nafion film. The results show that Nafion is a promising material for amperometric based relative humidity sensors. Furthermore, in this work, we have developed a technique to lithographically define the Nafion electrolyte using **oxygen plasma** in a reactive ion etch chamber, thereby making the proposed manufacturing technology compatible with existing silicon **microfabrication** techniques that are suitable for a cheap, high yield, mass fabrication scheme. (5 Refs)
Subfile: A B
Descriptors: batch processing (industrial); electrical conductivity; electrochemical sensors; electrolytic devices; humidity sensors;

lithography; micromachining; microsensors; polymer electrolytes; sputter etching
Identifiers: batch fabricated amperometric relative humidity sensor; amperometric relative humidity sensor; batch fabrication; planar amperometric gas sensors; alumina substrates; relative humidity measurement ; electrochemical cell; electrochemical cell electrodes; Nafion perfluorinated ion exchange polymer electrolyte; counter electrode; working electrode; current; conductivity modulation; hydrated Nafion film; lithographically defined Nafion electrolyte; **oxygen plasma** ; reactive ion etch chamber; manufacturing technology; silicon **microfabrication** techniques; mass fabrication scheme; Si; Al/sub 2/O/sub 3/; O/sub 2
Class Codes: A0725 (Hygrometry); A8280T (Chemical sensors); A0710C (Micromechanical devices and systems); B7320X (Humidity measurement); B7230L (Chemical sensors); B7320T (Chemical variables measurement); B7230M (Microsensors); B2575F (Fabrication of micromechanical devices)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Al2O3 sur - Al2 sur - Al sur - O3 sur - O sur - Al2O3 bin - Al2 bin - Al bin - O3 bin - O bin (Elements - 2)
O2 el - O el (Elements - 1)

2/9/11 (Item 11 from file: 2)
DIALOG(R)File 2:INSPEC

6370270 INSPEC Abstract Number: B1999-11-2575B-012
Title: Adhesion of polysilicon microbeams in controlled humidity ambients
Author(s): de Boer, M.P.; Clews, P.J.; Smith, B.K.; Michalske, T.A.
Author Affiliation: Sandia Nat. Labs., Albuquerque, NM, USA
Conference Title: Microelectromechanical Structures for Materials Research. Symposium p.131-6
Editor(s): Brown, S.; Gilbert, J.; Guckel, H.; Howe, R.; Johnson, G.; Krulevitch, P.; Muhlstein, C.
Publisher: Mater. Res. Soc, Warrendale, PA, USA
Publication Date: 1998 Country of Publication: USA xi+248 pp.
ISBN: 1 55899 424 6 Material Identity Number: XX-1999-00320
Conference Title: Microelectromechanical Structures for Materials Research. Symposium
Conference Date: 15-16 April 1998 Conference Location: San Francisco, CA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Experimental (X)
Abstract: We characterize in-situ the adhesion of surface micromachined polysilicon beams subject to controlled humidity ambients. Beams were freed by supercritical CO/sub 2/ drying. Consistent adhesion results were obtained using a post-treatment in an **oxygen plasma** which rendered the microbeams uniformly hydrophilic. Individual beam deformations were measured by optical interferometry after equilibration at a given relative humidity (RH). Validation of each adhesion measurement was accomplished by comparing the deformations with elasticity theory. The data indicates that adhesion increases exponentially with RH from 30% to 95%, with values from 1 mJ/m/sup 2/ to 50 mJ/m/sup 2/. Using the Kelvin equation, we show that the data should be independent of RH if a smooth interface is considered. By modeling a rough interface consistent with atomic force microscopy (AFM) data, the exponential trend is satisfactorily explained. (26 Refs)
Subfile: B
Descriptors: adhesion; elemental semiconductors; humidity; light interferometry; **micromechanical** devices; silicon
Identifiers: adhesion; polysilicon microbeam; surface micromachining; supercritical CO/sub 2/ drying; **oxygen plasma** treatment; hydrophilicity ; deformation; optical interferometry; relative humidity; elasticity theory ; Kelvin equation; rough interface; atomic force microscopy; **MEMS** device; Si
Class Codes: B2575B (Materials for micromechanical device technology)
Chemical Indexing:

Si el (Elements - 1)
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2/9/12 (Item 12 from file: 2)
DIALOG(R)File 2:INSPEC
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6321100 INSPEC Abstract Number: B1999-09-1320-027
Title: Wideband microwave switch by micromachining techniques
Author(s): Chienliu Chang; Peizen Chang; Kaihsiang Yen; Shey-Shi Lu
Author Affiliation: Inst. of Appl. Mech., Nat. Taiwan Univ., Taipei, Taiwan
Journal: Proceedings of the SPIE - The International Society for Optical Engineering Conference Title: Proc. SPIE - Int. Soc. Opt. Eng. (USA) vol.3514 p.229-36
Publisher: SPIE-Int. Soc. Opt. Eng,
Publication Date: 1998 Country of Publication: USA
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(1998)3514L.229:WMSM;1-C
Material Identity Number: C574-1998-299
U.S. Copyright Clearance Center Code: 0277-786X/98/$10.00
Conference Title: Micromachined Devices and Components IV
Conference Sponsor: SPIE
Conference Date: 21-22 Sept. 1998 Conference Location: Santa Clara, CA, USA
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: A micromachined microwave switch has been made on a semi-insulating GaAs substrate using a suspended membrane, gold coplanar waveguide (CPW), and electrostatic actuation as the switching mechanism. The electrostatic traction comes from the DC voltage applied between the ground of the CPW and the suspended membrane. The aluminum membrane is suspended over the CPW about 6 mu m. It ensures that the microwave propagating on the CPW is not coupled by the membrane in the undeformed state. Utilizing the large area of the CPW ground, the suspended membrane can be pulled down by only small DC voltage applied. A PECVD silicon nitride film is deposited on the CPW to prevent DC short. Due to the thin nitride film between the stretched membrane and the CPW, there are large wideband capacitances between them when the membrane is pulled down until it contacts the nitride for a large area. When the DC potential is removed, the tensile stress of the stretched membrane pulls it back to the up position, and the capacitive coupling becomes much smaller than that in the down position. The ratio of the off- to on-impedances of the switch is determined by the down- and up-capacitances in the two switching states. A very low switching time can be achieved by using membrane structure due to membrane tensile stress. Using the grid structures is to make the **oxygen plasma** penetrate and reduce the squeeze damping effect. S-parameter data was taken in the range from 0.1 to 18 GHz. A microwave isolation of -40 dB and an insertion loss of 0.5 dB in the range from 0.1 to 7 GHz has been achieved. The wideband performance in isolation and insertion loss ensures the monolithic integration capability with microwave and millimeter wave integrated circuits. (11 Refs)
Subfile: B
Descriptors: coplanar waveguides; electrostatic actuators; membranes; micromachining; microwave switches
Identifiers: wideband microwave switch; micromachining; semi-insulating GaAs substrate; suspended membrane; gold coplanar waveguide; electrostatic actuation; DC voltage; **MEMS** ; aluminum membrane; PECVD silicon nitride film; stretched membrane; tensile stress; capacitive coupling; very low switching time; grid structures; S-parameter data; insertion loss; isolation loss; microwave isolation; monolithic integration capability; millimeter wave integrated circuits; microwave wave integrated circuits; 0.1 to 18 GHz; 0.5 dB; GaAs; Au; Al
Class Codes: B1320 (Waveguide and stripline components); B2180B (Relays and switches); B2575F (Fabrication of micromechanical devices); B5180D (

(JP)
Treatment: Experimental (X)
Abstract: An accurate technique to measure the thermal conductivity k(T) of CVD diamond based on new **micromechanical** devices is presented. The thermal conductivity parallel to the surface of films with thicknesses ranging from 2 to several hundred mu m can be determined over a wide temperature range. The diamond films were patterned by RIE in an **oxygen plasma** to achieve accurate device dimensions. The silicon was completely removed from a defined area leaving diamond membranes and free standing diamond cantilevers. A thin film heater generated a temperature profile which was measured using several thermoresistors. Shape and dimensions of the structures were optimized using computer simulations (FEA). The effects of thermal radiation, additional metallization and insulation layers were minimized. Measurements on CZ silicon show a very good agreement with literature results. The thermal conductivity of diamond films with thicknesses between 3.6 and 8 mu m grown on a silicon substrate by the hot filament technique with different methane concentrations were measured between -195 and 300 degrees C. The measured values range between <1 and 5 W cm/sup -1/ K/sup -1/. (8 Refs)
Subfile: A B
Descriptors: CVD coatings; diamond; elemental semiconductors; **micromechanical** devices; semiconductor growth; semiconductor thin films; sputter etching; thermal conductivity; thermal conductivity measurement
Identifiers: computer simulations; thermal conductivity measurements; diamond films; new **micromechanical** devices; FEA; hot filament technique; several thermoresistors; -195 to 300 C; 3.6 to 8 micron; C
Class Codes: A0720 (Thermal instruments and techniques); A8115H (Chemical vapour deposition); A6855 (Thin film growth, structure, and epitaxy); A6860 (Physical properties of thin films, nonelectronic); A6670 (Nonelectronic thermal conduction and heat-pulse propagation in nonmetallic solids); B7320R (Thermal variables measurement); B2520C (Elemental semiconductors); B0520F (Vapour deposition); B2575 (Micromechanical device technology)
Chemical Indexing:
C el (Elements - 1)
Numerical Indexing: temperature 7.81E+01 to 5.73E+02 K; size 3.6E-06 to 8.0E-06 m

2/9/17 (Item 17 from file: 2)
DIALOG(R)File 2:INSPEC

5260807 INSPEC Abstract Number: A9611-8115H-071, B9606-7320R-012
Title: Measurements of the thermal conductivity of CVD diamond films using micromechanical **devices**
Author(s): Jansen, E.; Obermeier, E.
Author Affiliation: Dept. of Electr. Eng., Tech. Univ. Berlin, Germany
Journal: Physica Status Solidi A vol.154, no.1 p.395-402
Publisher: Akademie Verlag,
Publication Date: 16 March 1996 Country of Publication: West Germany
CODEN: PSSABA ISSN: 0031-8965
SICI: 0031-8965(19960316)154:1L.395:MTCD;1-3
Material Identity Number: P159-96005
U.S. Copyright Clearance Center Code: 0031-8965/96/$3.50+0.25
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: A new technique to measure the thermal conductivity k(T) of CVD diamond is presented. The thermal conductivity parallel to the surface of films with thicknesses ranging from 2 mu m up to several hundred mu m can be determined over a wide temperature range. The measurements are carried out with **micromechanical** devices, that are fabricated by standard thin film technology. Patterning of the diamond film has been performed in an **oxygen plasma** . A thin film heater generates a temperature profile which is measured by several thermoresistors. Measured values of the thermal conductivity of single crystalline silicon show a very good agreement with

Hatzakis, M.
Author Affiliation: Inst. of Microelectron., NCSR Demokritos, Aghia Parakskevi Attikis, Greece
Journal: Journal of Vacuum Science & Technology B (Microelectronics and Nanometer Structures) vol.14, no.5 p.3332-8
Publisher: AIP for American Vacuum Soc,
Publication Date: Sept.-Oct. 1996 Country of Publication: USA
CODEN: JVTBD9 ISSN: 0734-211X
SICI: 0734-211X(199609/10)14:5L.3332:SOPD;1-W
Material Identity Number: C067-96007
U.S. Copyright Clearance Center Code: 0734-211X/96/14(5)/3332/7/$10.00
Language: English Document Type: Journal Paper (JP)
Treatment: Practical (P); Experimental (X)
Abstract: A near-surface imaging process using wet silylation and **oxygen plasma** development is described. New characterization techniques of films spun on wafers are presented for: (a) quantitative Si concentration determination using proton nuclear magnetic resonance spectroscopy (H), and (b) glass transition and/or flow temperature determination (T/sub g/) of the silylated photoresist using thermomechanical analysis. H-line, I-line, and deep ultraviolet lithography (at 248 nm) results are presented, while extension to 193 nm lithography is discussed. Very anisotropic and high aspect ratio pattern transfer to Si, with fluorine-only containing plasmas is demonstrated. Possible applications are discussed. (62 Refs)
Subfile: B
Descriptors: glass transition; integrated circuit technology; photochemistry; photolithography; photoresists; proton magnetic resonance; spectrochemical analysis; sputter etching; thermal stability
Identifiers: wet silylation; O plasma development; photoresists; versatile lithographic process; microelectronics; **microfabrication** ; near-surface imaging process; film characterization techniques; spun on films; quantitative Si concentration determination; proton nuclear magnetic resonance spectroscopy; glass transition temperature determination; flow temperature determination; thermomechanical analysis; H-line lithography; I-line lithography; deep ultraviolet lithography; anisotropic high aspect ratio pattern transfer; F-only containing plasmas; thermal stability; hexamethyl cyclotrisilazane; 248 nm
Class Codes: B2550G (Lithography); B2570 (Semiconductor integrated circuits); B2550E (Surface treatment for semiconductor devices); B7320T (Chemical variables measurement)
Numerical Indexing: wavelength 2.48E-07 m

2/9/16 (Item 16 from file: 2)
DIALOG(R)File 2:INSPEC

5324331 INSPEC Abstract Number: A9617-0720-001, B9609-7320R-001
Title: Thermal conductivity measurements on diamond films based on micromechanical **devices**
Author(s): Jansen, E.; Dorsch, O.; Obermeier, E.; Kulisch, W.
Author Affiliation: Tech. Univ. Berlin, Germany
Journal: Diamond and Related Materials Conference Title: Diam. Relat. Mater. (Switzerland) vol.5, no.6-8 p.644-8
Publisher: Elsevier,
Publication Date: May 1996 Country of Publication: Switzerland
CODEN: DRMTE3 ISSN: 0925-9635
SICI: 0925-9635(199605)5:6/8L.644:TCMD;1-I
Material Identity Number: A464-96005
U.S. Copyright Clearance Center Code: 0925-9635/96/$15.00
Conference Title: 6th European Conference on Diamond, Diamond-like and Related Materials (Diamond Films'95)
Conference Sponsor: Appl. Phys. Lab.; ASTeX; Elsevier Sci.; Norton Diamond Film; et al
Conference Date: 10-15 Sept. 1995 Conference Location: Barcelona, Spain
Language: English Document Type: Conference Paper (PA); Journal Paper

literature results. The thermal conductivities of diamond films with thicknesses between 3.6 and 8 mu m grown on a silicon substrate by the hot filament technique with different methane concentrations have been measured between -195 and 300 degrees C. The measured values range between less than 1 W/cm K for -195 degrees C and 5 W/cm K for room temperature. (13 Refs)

Subfile: A B

Descriptors: chemical vapour deposition; diamond; **micromechanical** devices; Raman spectra; silicon; sputtered coatings; substrates; thermal conductivity; thermoelectric devices; thin films; vapour phase epitaxial growth

Identifiers: CVD diamond films; thermal conductivity; **micromechanical** devices; film surface; thin film heater; temperature profile; thermoresistor measurement; Si single crystals; silicon substrate; hot filament technique; 100 to 1000 K; 1000 to 1700 cm/sup -1/; C; Si; C:B; CH/sub 4/; H/sub 2/-CH/sub 4

Class Codes: A8115H (Chemical vapour deposition); A7830G (Infrared and Raman spectra in inorganic crystals); A6855 (Thin film growth, structure, and epitaxy); A6170T (Doping and implantation of impurities); A6670 (Nonelectronic thermal conduction and heat-pulse propagation in nonmetallic solids); B7320R (Thermal variables measurement); B7210X (Other instrumentation and measurement systems); B2575 (Micromechanical device technology)

Chemical Indexing:

C el (Elements - 1)

Si el (Elements - 1)

C:B bin - B bin - C bin - B el - C el - B dop (Elements - 1,1,2)

CH4 bin - H4 bin - C bin - H bin (Elements - 2)

H2CH4 bin - H2 bin - H4 bin - C bin - H bin (Elements - 2)

Numerical Indexing: temperature 1.0E+02 to 1.0E+03 K; wavelength 5.9E-06 to 1.0E-05 m

2/9/18 (Item 18 from file: 2)

DIALOG(R)File 2:INSPEC

4709711 INSPEC Abstract Number: B9408-0560-004

Title: Applications of fluorocarbon polymers in micromechanics and micromachining

Author(s): Jansen, H.V.; Gardeniers, J.G.E.; Elders, J.; Tilmans, H.A.C.; Elwenspoek, M.

Author Affiliation: MESA Res. Inst., Twente Univ., Enschede, Netherlands

Journal: Sensors and Actuators A (Physical) vol.A41, no.1-3 p. 136-40

Publication Date: 1 April 1994 Country of Publication: Switzerland

CODEN: SAAPEB ISSN: 0924-4247

U.S. Copyright Clearance Center Code: 0924-4247/94/$07.00

Conference Title: Eurosensors VII Conference and Exhibition

Conference Sponsor: IMEKO

Conference Date: 26-29 Sept. 1993 Conference Location: Budapest, Hungary

Language: English Document Type: Conference Paper (PA); Journal Paper (JP)

Treatment: Applications (A); Practical (P)

Abstract: Several thin-film deposition and etching techniques of the polymer fluorocarbon are investigated and the resulting thin-film properties are compared with those of commercially available bulk polytetrafluoroethylene. The most promising deposition technique is performed in a conventional reactive ion etcher using a carbonhydrotrifluoride (CHF/sub 3/) plasma. By changing the deposition parameters, control of the properties and step coverage of the deposited thin films within a certain range is possible, e.g., uni-directional and conformal step coverage of deposited thin films can be obtained. Etching is performed with the help of an evaporated aluminium oxide mask using an **oxygen** , nitrogen,or sulfurhexafluoride **plasma** for isotropic etching, or a CHF/sub 3/ plasma giving a directional etch profile. The combination of

1168-71
Publication Date: May 1985 Country of Publication: USA
CODEN: JESOAN ISSN: 0013-4651
Language: English Document Type: Journal Paper (JP)
Treatment: Experimental (X)
Abstract: Relative rates were measured for polymer film loss in an **oxygen plasma** environment. Both polymers doped with iodine compounds and iodinated polymers show high resistance to the **oxygen plasma** . ESCA studies on iodinated polystyrenes indicate that the **oxygen plasma** converts the iodo-substituent to iodine oxides. Through taking advantage of the **oxygen plasma** resistance of iodine compounds, the authors have been able to come up with a two layer photolithography system for **microfabrication** . In the context of this two-layer process, evaluations were made of a positive photoresist formulated from OFPR-800 (Tokyo Ohka Kogyo Company) and 2,4,6-triiodophenol as well as a negative deep-UV resist composed of iodinated poly(vinyl phenol) and 3-3'-diazidodiphenyl sulfone. (8 Refs)
Subfile: B
Descriptors: electron spectra; iodine; iodine compounds; photolithography ; polymer films; resists; spectrochemical analysis; sputter etching
Identifiers: O plasma; polymers:I compounds; polyvinyl phenol:I; I oxides ; spectrochemical analysis; plasma etching; plasma resistance; polymer film loss; iodinated polymers; ESCA; polystyrenes; two layer photolithography; **microfabrication** ; positive photoresist; OFPR-800; 2,4,6-triiodophenol; negative deep-UV resist; 3-3'-diazidodiphenyl sulfone
Class Codes: B2220C (General fabrication techniques); B2550E (Surface treatment and oxide film formation); B2550G (Lithography)

2/9/22 (Item 22 from file: 2)
DIALOG(R)File 2:INSPEC

02390068 INSPEC Abstract Number: A85021332, B85012211
Title: Maskless graph etching of organic solid film by oxygen plasma **and its mechanism-dry development in semiconductor** microfabrication **process**
Author(s): Tsuda, M.; Yabuta, M.; Oikawa, S.; Yokota, A.; Nakane, H.
Author Affiliation: Chiba Univ., Japan
Conference Title: Proceedings of the International Ion Engineering Congress. The 7th Symposium (1983 International) on Ion Sources and Ion Assisted Technology (ISIAT '83) and the 4th International Conference on Ion and Plasma Assisted Techniques (IPAT '83) p.1485-92 vol.3
Editor(s): Takagi, T.
Publisher: Int. Ion Eng. Congress, Kyoto, Japan
Publication Date: 1983 Country of Publication: Japan 3 vol. 1989 pp.
Conference Sponsor: Inst. Electr. Eng. Japan
Conference Date: 12-16 Sept. 1983 Conference Location: Kyoto, Japan
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
Abstract: In the semiconductor **microfabrication** process, the resist pattern is transferred into the substrate using the dry plasma etch technique, where the resist pattern plays a role of the etching mask in the graph etching of the substrate. In the multi-layer resist technique, a fine pattern of SiO/sub 2/ film, which is resistant to the **oxygen plasma** , acts as an etching mask in the graph etching of a thick organic resist layer. Since the plasma used in the dry etch process is highly reactive with the substrate, the resistant etching mask is believed to be absolutely necessary in the dry etch process. A maskless graph etching of organic solid film, or a dry etch technique of organic resist layer without an etching mask, and its mechanism are described. (10 Refs)
Subfile: A B
Descriptors: oxygen; resists; semiconductor technology; sputter etching
Identifiers: maskless graph etching; O/sub 2/ plasma; multilayer resist technique; automatic bis azide; organic solid film; dry development; semiconductor **microfabrication** process; resist pattern; dry plasma etch technique; SiO/sub 2/ film; organic resist layer

Class Codes: A5275 (Plasma devices and applications); A8160C (Semiconductors); B2550E (Surface treatment and oxide film formation); B2550G (Lithography)

2/9/23 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

06025282 E.I. No: EIP02126896801
Title: Self-assembly templates by selective plasma surface modification of micropatterned photoresist
Author: Seo, Jeonggi; Ertekin, Elif; Pio, Michael S.; Lee, Luke P.
Corporate Source: Berkeley Sensor and Actuator Center Department of Bioengineering Univ. of California at Berkeley, Berkeley, CA 94720, United States
Conference Title: 15th IEEE International Conference on Micro Electro Mechanical Systems MEMS 2002
Conference Location: Las Vegas, NV, United States Conference Date: 20020120-20020124
Sponsor: IEEE; Robotics and Automation Society
E.I. Conference No.: 59062
Source: Proceedings of the IEEE Micro Electro Mechanical Systems (MEMS) 2002. p 192-195 (IEEE cat n 02CH37266)
Publication Year: 2002
CODEN: PMEME5
Language: English
Document Type: CA; (Conference Article) Treatment: T; (Theoretical)
Journal Announcement: 0203W5
Abstract: Self-assembly templates, consisting of micro-patterned hydrophobic and hydrophilic regions, are fabricated using a plasma surface modification technique. With exposure to **O // 2 plasma** , photoresist, silicon, and glass can be modified to hydrophilic surfaces. When followed by SF//6 or CF//4 plasma, the surface of photoresist can be modified to hydrophobic while silicon and glass surfaces are not affected. The difference in surface energy between the hydrophilic and hydrophobic regions is large, as indicated by the differential contact angle of 120 degree between the two regions for wetting with water. Photonic crystals are made from colloidal solutions and protein patterning is demonstrated using self-assembly templates made by selective plasma surface modification. The maximized surface energy difference between substrate and template patterning allows an ideal self-assembly of photonic crystals and selective attachment of proteins. 10 Refs.
Descriptors: **Microelectromechanical** devices; Surface treatment; Plasma applications; Microstructure; Hydrophilicity; Hydrophobicity; Semiconducting silicon; Proteins
Identifiers: Self assembly template; Selective plasma surface; Micropatterned photoresist
Classification Codes:
712.1.1 (Single Element Semiconducting Materials)
704.1 (Electric Components); 932.3 (Plasma Physics); 801.4 (Physical Chemistry); 931.2 (Physical Properties of Gases, Liquids & Solids); 712.1 (Semiconducting Materials)
704 (Electric Components & Equipment); 931 (Applied Physics Generally); 932 (High Energy Physics; Nuclear Physics; Plasma Physics); 801 (Chemistry); 712 (Electronic & Thermionic Materials)
70 (ELECTRICAL ENGINEERING, GENERAL); 93 (ENGINEERING PHYSICS); 80 (CHEMICAL ENGINEERING, GENERAL); 71 (ELECTRONICS & COMMUNICATION ENGINEERING)

2/9/24 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

06010064 E.I. No: EIP02086867892
Title: Integration of sputtered silicon microstructures with

pre-fabricated CMOS circuitry
Author: Honer, Kenneth A.; Kovacs, Gregory T.A.
Corporate Source: CIS-218X Stanford University, Stanford, CA 94305-4075, United States
Source: Sensors and Actuators, A: Physical v 91 n 3 Jul 15 2001. p 386-397
Publication Year: 2001
CODEN: SAAPEB ISSN: 0924-4247
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 0202W4
Abstract: This paper describes a novel fabrication process for creating sputtered silicon microstructures similar to those commonly made using LPCVD polysilicon. Unlike LPCVD polysilicon processes, however, this low-temperature sputtered process is compatible with pre-fabricated aluminum-metallized CMOS circuitry. Both polyimide and conventional oxide sacrificial layers were used, with the former being removed using **oxygen plasma** . This dry-release step eliminated the need for critical point drying commonly required for wet releases. To evaluate sputtered silicon for use in **MEMS** , several properties were investigated, including in-plane stress, strain gradient, density, surface roughness, electrical resistivity, and HF permeability. Tensile stress values lower than 100 MPa were achieved by varying the deposition parameters. Average strain gradients were an inverse square function of thickness. Densities were slightly lower than bulk silicon values. Surface roughness was less than 6 nm rms. The electrical conductivity of the silicon bare films was low but was increased by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. Finally, to demonstrate the technology, an electrostatically deflected plate structure was fabricated above a capacitance measurement circuit and performance results are presented. 27 Refs.
Descriptors: Polysilicon; CMOS integrated circuits; Plasmas; Stresses; Strain; Density (specific gravity); Surface roughness; Mechanical permeability; Capacitance; **Microelectromechanical** devices
Identifiers: Sputtered silicon microstructures; CMOS circuitry; **Oxygen plasma** ; Strain gradient
Classification Codes:
549.3 (Others, incl. Bismuth, Boron, Cadmium, Cobalt, Mercury, Niobium, Selenium, Silicon, Tellurium); 714.2 (Semiconductor Devices & Integrated Circuits); 932.3 (Plasma Physics); 931.2 (Physical Properties of Gases, Liquids & Solids); 701.1 (Electricity, Basic Concepts & Phenomena); 732.1 (Control Equipment)
549 (Nonferrous Metals & Alloys); 714 (Electronic Components & Tubes); 932 (High Energy Physics; Nuclear Physics; Plasma Physics); 931 (Applied Physics Generally); 701 (Electricity & Magnetism); 732 (Control Devices)
54 (METALLURGICAL ENGINEERING, METAL GROUPS); 71 (ELECTRONICS & COMMUNICATION ENGINEERING); 93 (ENGINEERING PHYSICS); 70 (ELECTRICAL ENGINEERING, GENERAL); 73 (CONTROL ENGINEERING)

2/9/25 (Item 3 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

06002058 E.I. No: EIP02066850235
Title: Deep reactive ion etching of silicon carbide
Author: Tanaka, S.; Rajanna, K.; Abe, T.; Esashi, M.
Corporate Source: Dept. Mechatronics and Prec. Eng. Tohoku University, Aoba-ku, Sendai 980-8579, Japan
Source: Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures v 19 n 6 November/December 2001. p 2173-2176
Publication Year: 2001
CODEN: JVTBD9 ISSN: 0734-211X
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)

Journal Announcement: 0202W2

Abstract: More than 100-mum-deep reaction ion etching (RIE) of silicon carbide (SiC) for **microelectromechanical** systems used in harsh environments were performed. Sulfur hexafluoride mixed with oxygen was used as an etching gas and electroplated nickel was used as a mask. First, 5 h etching experiments using etching gases with 0%, 5%, and 20% oxygen were performed by supplying rf power of 150 and 130 W to an ICP antenna and a sample stage. Following this, a 7 h etching experiment using an etching gas with 5% oxygen was performed by increasing the rf power to the sample stage of 150 W. The resulting data was analyzed in detail. (Edited abstract) 22 Refs.

Descriptors: Reactive ion etching; Silicon carbide; Inductively coupled **plasma** ; Sulfur compounds; **Oxygen** ; Masks; Nickel plating; Gases; Antennas ; Permanent magnets; Scanning electron microscopy; Photolithography; **Microelectromechanical** devices

Identifiers: Deep reactive ion etching; Sulfur hexafluoride plasma; Inductively coupled plasma reactive ion etcher; Electroplated nickel masks; Microloading effect

Classification Codes:

802.2 (Chemical Reactions); 804.2 (Inorganic Compounds); 932.2 (Nuclear Physics); 714.2 (Semiconductor Devices & Integrated Circuits); 548.1 (Nickel); 539.3 (Metal Plating)

802 (Chemical Apparatus & Plants; Unit Operations; Unit Processes); 804 (Chemical Products Generally); 932 (High Energy Physics; Nuclear Physics; Plasma Physics); 714 (Electronic Components & Tubes); 548 (Nickel & Alloys); 539 (Metals Corrosion & Protection; Metal Plating)

80 (CHEMICAL ENGINEERING, GENERAL); 93 (ENGINEERING PHYSICS); 71 (ELECTRONICS & COMMUNICATION ENGINEERING); 54 (METALLURGICAL ENGINEERING, METAL GROUPS); 53 (METALLURGICAL ENGINEERING, GENERAL)

2/9/26 (Item 4 from file: 8)

05846949 E.I. No: EIP01276566144

Title: Improvement of Si/SiO//2 mask etching selectivity in the new D-RIE process

Author: Ohara, J.; Kano, K.; Takeuchi, Y.; Otsuka, Y.

Corporate Source: Research Laboratories Denso Corporation, Nisshin, Aichi 470-0111, Japan

Conference Title: 14th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2001)

Conference Location: Interlaken, Switzerland Conference Date: 20010121-20010125

Sponsor: IEEE Robotics and Automation Society

E.I. Conference No.: 58191

Source: Proceedings of the IEEE Micro Electro Mechanical Systems (MEMS) 2001. p 76-79 (IEEE cat n 01CH37090)

Publication Year: 2001

CODEN: PMEME5

Language: English

Document Type: CA; (Conference Article) Treatment: T; (Theoretical)

Journal Announcement: 0107W1

Abstract: This paper describes an improvement of Si/SiO//2 mask etching selectivity in the new D-RIE process that we presented in **MEMS** 2000. This process, which repeats the conventional D-RIE (ASE process) and **O // 2** **plasma** irradiation processes alternately, can improve the aspect ratio due to the prevention of lateral etching. However, the SiO//2mask erosion of this process was 2.7 times as high as that of the conventional D-RIE process because the SiO//2 mask is sputtered by oxygen ion in the **O // 2** **plasma** irradiation process. Therefore the highest aspect ratio:46 was restricted by mask consumption. In this study, we suppressed the SiO//2 mask consumption. This suppression improves etching selectivity and increases the highest aspect ratio up to 60. Furthermore, the required time is reduced to 2/3 of the prior result. 4 Refs.

Descriptors: *Reactive ion etching; Masks; Plasma etching; Semiconducting

silicon; Silica; Irradiation; Plasmas; Aspect ratio; Sputter deposition; Oxygen
Identifiers: Mask etching selectivity; Plasma irradiation processes
Classification Codes:
712.1.1 (Single Element Semiconducting Materials)
802.2 (Chemical Reactions); 714.2 (Semiconductor Devices & Integrated Circuits); 932.3 (Plasma Physics); 712.1 (Semiconducting Materials); 804.2 (Inorganic Compounds); 711.1 (Electromagnetic Waves in Different Media); 932.1 (High Energy Physics)
802 (Chemical Apparatus & Plants; Unit Operations; Unit Processes); 714 (Electronic Components & Tubes); 932 (High Energy Physics; Nuclear Physics; Plasma Physics); 712 (Electronic & Thermionic Materials); 804 (Chemical Products Generally); 711 (Electromagnetic Waves); 943 (Mechanical & Miscellaneous Measuring Instruments)
80 (CHEMICAL ENGINEERING, GENERAL); 71 (ELECTRONICS & COMMUNICATION ENGINEERING); 93 (ENGINEERING PHYSICS); 94 (INSTRUMENTS & MEASUREMENT)

2/9/27 (Item 5 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05710756 E.I. No: EIP00115417398
Title: Chemical vapor deposition of fluoroalkylsilane monolayer films for adhesion control in microelectromechanical **systems**
Author: Mayer, T.M.; de Boer, M.P.; Shinn, N.D.; Clews, P.J.; Michalske, T.A.
Corporate Source: Sandia Natl Lab, Albuquerque, NM, USA
Source: Journal of Vacuum Science and Technology B: Microelectronics and Nanometer Structures v 18 n 5 Sep 2000. p 2433-2440
Publication Year: 2000
CODEN: JVTBD9 ISSN: 0734-211X
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical); X; (Experimental)
Journal Announcement: 0101W1
Abstract: A new process for applying a hydrophobic, low adhesion energy coating to **microelectromechanical** (**MEMS**) devices was developed. A fluorinated alkylsilane monolayer film is synthesized in a low-pressure chemical vapor deposition process using FOTS and water vapor precursors at room temperature. Film thickness is self-limiting by virtue of the inability of precursors to stick to the fluorocarbon surface of the film once it has formed. An in situ downstream microwave **plasma** cleaning process using **O // 2** or H//2O was demonstrated. Parts initially contaminated with hydrocarbons are effectively cleaned, leaving a uniform hydrophilic oxide surface on which to grow the fluorocarbon coating. 38 Refs.
Descriptors: Semiconducting films; **Microelectromechanical** devices; Chemical vapor deposition; Adhesion; Film preparation; Fluorocarbons; Monolayers; Aspect ratio; Atomic force microscopy; Polycrystalline materials
Identifiers: Fluoroalkylsilane monolayer films
Classification Codes:
712.1 (Semiconducting Materials); 732.1 (Control Equipment); 802.2 (Chemical Reactions); 813.1 (Coating Techniques); 931.2 (Physical Properties of Gases, Liquids & Solids); 804.1 (Organic Components)
712 (Electronic & Thermionic Materials); 732 (Control Devices); 802 (Chemical Apparatus & Plants); 813 (Coatings & Finishes); 931 (Applied Physics); 804 (Chemical Products)
71 (ELECTRONICS & COMMUNICATIONS); 73 (CONTROL ENGINEERING); 80 (CHEMICAL ENGINEERING); 81 (CHEMICAL PROCESS INDUSTRIES); 93 (ENGINEERING PHYSICS)

2/9/28 (Item 6 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05623343 E.I. No: EIP00085279993

Title: Miniaturized tin oxide (SnO//x) sensor by using oxygen plasma **treated thin film technique**

Author: Lian, Kun; Ling, Zhong Geng; Jiang, Jie Chao

Corporate Source: Louisiana State Univ, Baton Rouge, LA, USA

Conference Title: International Conference on Sensors and Control Techniques (ICSC 2000)

Conference Location: Wuhan, China Conference Date: 19000619-19000621

Sponsor: SPIE; Chinese Society of Instruments; Chinese Society of Electronics; Wuhan University ot Technology; et al.

Source: Proceedings of SPIE - The International Society for Optical Engineering v 4077 2000. Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, USA. p 518-525

Publication Year: 2000

CODEN: PSISDG ISSN: 0277-786X

Language: English

Document Type: CA; (Conference Article) Treatment: X; (Experimental)

Journal Announcement: 0009W3

Abstract: A new processing technique for thin film tin oxide gas sensor has been described in this paper. **Oxygen plasma** is used as film sensitizing tool, in which the temperature only goes up to 190 degree C for a short time. By using this technique, the tin oxide thin film sensors with smooth, uniform surface have been made with a reasonable sensitivity to the CO gas at room temperature. The **oxygen plasma** treatment decreases both film resistivity and film grain size. This new technique makes the tin oxide sensor fabrication compatible with the microelectronic processing. (Author abstract) 20 Refs.

Descriptors: Chemical sensors; Semiconducting tin compounds; Thin film devices; **Plasma** applications; **Oxygen** ; **Microelectromechanical devices**

Identifiers: Tin oxide; **Oxygen plasma** treatment

Classification Codes:

712.1.2 (Compound Semiconducting Materials)

712.1 (Semiconducting Materials); 714.2 (Semiconductor Devices & Integrated Circuits); 932.3 (Plasma Physics); 601.1 (Mechanical Devices)

801 (Chemical Analysis & Physical Chemistry); 712 (Electronic & Thermionic Materials); 714 (Electronic Components); 932 (High Energy, Nuclear & Plasma Physics); 804 (Chemical Products); 601 (Mechanical Design)

80 (CHEMICAL ENGINEERING); 71 (ELECTRONICS & COMMUNICATIONS); 93 (ENGINEERING PHYSICS); 60 (MECHANICAL ENGINEERING)

2/9/29 (Item 7 from file: 8)

DIALOG(R)File 8:Ei Compendex(R)

05580021 E.I. No: EIP00065196848

Title: Low-temperature anodic bonding to silicon nitride

Author: Weichel, S.; de Reus, R.; Bouaidat, S.; Rasmussen, P.A.; Hansen, O.; Birkelund, K.; Dirac, H.

Corporate Source: Mikroelektronik Centret, Lyngby, Den

Conference Title: The 10th International Conference on Solid-State Sensors and Actuators TRANSDUCERS '99

Conference Location: Sendai, Jpn Conference Date: 19990607-19990610

Sponsor: Institute of Electrical Engineers

E.I. Conference No.: 56883

Source: Sensors and Actuators, A: Physical v 82 n 1 2000. p 249-253

Publication Year: 2000

CODEN: SAAPEB ISSN: 0924-4247

Language: English

Document Type: JA; (Journal Article) Treatment: X; (Experimental)

Journal Announcement: 0007W4

Abstract: Low-temperature anodic bonding to stoichiometric silicon nitride surfaces has been performed in the temperature range from 350 degree C to 400 degree C. It is shown that the bonding is improved considerably if the nitride surfaces are either oxidized or exposed to an

oxygen plasma prior to the bonding. Both bulk and thin-film glasses were used in the bonding experiments. Bond quality was evaluated using a tensile test on structured dies. The effect of oxygen-based pre-treatments of the nitride surface on the bond quality has been evaluated. Bond strengths up to 35 N/mm**2 and yields up to 100% were obtained. (Author abstract) 14 Refs.

Descriptors: **Microelectromechanical** devices; Silicon nitride; Glass bonding; Plasma applications; Oxidation; Tensile testing; Dies; Bond strength (materials)

Identifiers: Anodic bonding

Classification Codes:

601.1 (Mechanical Devices); 732.1 (Control Equipment); 804.2 (Inorganic Components); 812.3 (Glass); 932.3 (Plasma Physics); 802.2 (Chemical Reactions)

601 (Mechanical Design); 732 (Control Devices); 804 (Chemical Products); 812 (Ceramics & Refractories); 932 (High Energy, Nuclear & Plasma Physics); 802 (Chemical Apparatus & Plants)

60 (MECHANICAL ENGINEERING); 73 (CONTROL ENGINEERING); 80 (CHEMICAL ENGINEERING); 81 (CHEMICAL PROCESS INDUSTRIES); 93 (ENGINEERING PHYSICS)

2/9/30 (Item 8 from file: 8)

05451174 E.I. No: EIP00014965142

Title: Rapid prototyping of microfluidic switches in poly(dimethyl siloxane) and their actuation by electro-osmotic flow

Author: Duffy, David C.; Schueller, Olivier J.A.; Brittain, Scott T.; Whitesides, George M.

Corporate Source: Harvard Univ, Cambridge, MA, USA

Source: Journal of Micromechanics and Microengineering v 9 n 3 1999. p 211-217

Publication Year: 1999

CODEN: JMMIEZ ISSN: 0960-1317

Language: English

Document Type: JA; (Journal Article) Treatment: A; (Applications); X; (Experimental)

Journal Announcement: 0002W3

Abstract: This paper describes a procedure for rapidly and conveniently prototyping microfluidic devices that are useful with aqueous solutions. A design (with diameters of channels greater than equivalent to 20 mu m) is created in a computer-aided design program and printed at high resolution on a transparency. This transparency is used as a mask in photolithography to create a master in positive relief photoresist: casting poly(dimethyl siloxane) (PDMS) against this master yields a polymeric replica containing a network of bas-relief channels. The channels are closed and sealed irreversibly by oxidizing the replica and another flat substrate (PDMS, glass, silicon, silicon oxide) in an **oxygen plasma** and bringing the two surfaces into conformal contact. Oxidation of the polymer allows the formation of a seal without using adhesives; it also generates channels that support electro-osmotic flow (EOF) and fill easily with aqueous solutions. Two microfluidic devices - a fluidic switch and a side channel flow controller - have been fabricated using this rapid prototyping methodology. These devices were tested using aqueous solutions as the test fluid and actuated by EOF. (Author abstract) 20 Refs.

Descriptors: **Microelectromechanical** devices; Rapid prototyping; Computer aided design; Transparency; Photolithography; Photoresists; Silicones; Oxidation; Solutions

Identifiers: Microfluidic switches; Polydimethyl siloxane; Actuation; Electroosmotic flow

Classification Codes:

815.1.1 (Organic Polymers)

714.2 (Semiconductor Devices & Integrated Circuits); 723.5 (Computer Applications); 741.1 (Light/Optics); 813.2 (Coating Materials); 815.1 (Polymeric Materials); 802.2 (Chemical Reactions)

714 (Electronic Components); 723 (Computer Software); 741 (Optics &

Corporate Source: Natl Taiwan Univ, Taipei, Taiwan
Conference Title: Proceedings of the 1998 Conference on Micromachined Devices and Components IV
Conference Location: Santa Clara, CA, USA Conference Date: 19980921-19980922
Sponsor: SPIE
E.I. Conference No.: 49722
Source: Proceedings of SPIE - The International Society for Optical Engineering v 3514 1998. SPIE, Bellingham, WA, USA. p 229-236
Publication Year: 1998
CODEN: PSISDG ISSN: 0277-786X
Language: English
Document Type: CA; (Conference Article) Treatment: G; (General Review)
Journal Announcement: 9904W1
Abstract: A micromachined microwave switch has been made on a semi-insulating GaAs substrate using a suspended membrane, gold coplanar waveguide (CPW), and electrostatic actuation as the switching mechanism. The electrostatic traction comes from the dc voltage applied between the ground of the CPW and the suspended membrane. The aluminum membrane is suspended over the CPW about 6 mu m. It ensures that the microwave propagating on the CPW is not coupled by the membrane in the undeformed state. Utilizing the large area of the CPW ground, the suspended membrane can be pulled down by only small dc voltage applied. A PECVD silicon nitride film is deposited on the CPW to prevent dc short. Due to the thin nitride film between the stretched membrane and the CPW, there are large wideband capacitances between them when the membrane is pulled down until it contact the nitride for a large area. When the dc potential is removed, the tensile stress of the stretched membrane pull it back to the up position, and the capacitive coupling becomes much smaller than that in the down position. The ratio of the off- to on-impedances of the switch is determined by the down- and up-capacitances in the two switching states. A very low switching time can be achieved by using membrane structure due to membrane tensile stress. Using the grid structures is to make the **oxygen plasma** penetrate and reduce the squeeze damping effect. S-parameter data was taken in the range from 0.1 to 18 GHz using Hp8510C network analyzer and Cascade Probe station. A microwave isolation of minus 40 dB and an insertion loss of 0.5 dB in the range from 0.1 to 7 GHz has been achieved. The wideband performance in isolation and insertion loss ensures the monolithic integration capability with microwave and millimeter wave integrated circuits (MMIC). (Author abstract) 11 Refs.
Descriptors: Microwave devices; Semiconductor switches; Waveguides; **Microelectromechanical** devices; Micromachining; Semiconducting gallium arsenide; Electrostatic devices; Guided electromagnetic wave propagation; Silicon nitride; Aluminum
Identifiers: Microwave switches; Electrostatic **micromechanical** switches
Classification Codes:
714.2 (Semiconductor Devices & Integrated Circuits); 714.3 (Waveguides); 732.1 (Control Equipment); 604.2 (Machining Operations)
714 (Electronic Components); 715 (General Electronic Equipment); 732 (Control Devices); 604 (Metal Cutting & Machining)
71 (ELECTRONICS & COMMUNICATIONS); 73 (CONTROL ENGINEERING); 60 (MECHANICAL ENGINEERING)

2/9/33 (Item 11 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

05070082 E.I. No: EIP98074293493
Title: Deposition of silicon oxinitride films from hexamethyldisilizane (HMDS) by PECVD
Author: Gonzalez-Luna, R.; Rodrigo, M.T.; Jimenez, C.; Martinez-Duart, J.M.
Corporate Source: Universidad Autonoma Madrid, Madrid, Spain
Conference Title: Proceedings of the 1996 10th International Conference on Thin Films, ICTF-10
Conference Location: Salamanca, Spain Conference Date:

19960923-19960927
E.I. Conference No.: 48670
Source: Thin Solid Films v 317 n 1-2 Apr 1 1998. p 347-350
Publication Year: 1998
CODEN: THSFAP ISSN: 0040-6090
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9809W3
Abstract: Silicon oxinitride films are of great industrial interest due to their singular electrical, optical and mechanical properties. The interest in obtaining these films from liquid sources is greatly increasing because of the lower harmfulness and of the new potential features that can be obtained from the precursor chemical structure. Thin films of silicon carbo-oxi-nitrides have been deposited by PECVD from a liquid source, hexamethyldisilazane, and different mixtures of oxygen and ammonia. We have investigated the effects of the variations in the composition of the reactant gases and in the applied power levels, on the visible and infrared optical and **micromechanical** properties. The refractive index can be varied continuously from 1.4 to 1.8, the IR absorption in the 8-13 mu m region can be tailored to the desired shape, and the hardness and Young's modulus modified, depending on the deposition conditions. (Author abstract) 6 Refs.
Descriptors: Thin films; Silicon compounds; Chemical vapor deposition; **Plasma** applications; Liquids; Mixtures; **Oxygen** ; Ammonia; Infrared spectroscopy; Optical properties
Identifiers: Silicon oxinitride; Hezamethyldixilizane; Plasma enhance chemical vapor deposition
Classification Codes:
804.2 (Inorganic Components); 802.2 (Chemical Reactions); 932.3 (Plasma Physics); 804.1 (Organic Components); 741.1 (Light/Optics); 931.2 (Physical Properties of Gases, Liquids & Solids)
804 (Chemical Products); 802 (Chemical Apparatus & Plants); 932 (High Energy, Nuclear & Plasma Physics); 741 (Optics & Optical Devices); 931 (Applied Physics)
80 (CHEMICAL ENGINEERING); 93 (ENGINEERING PHYSICS); 74 (OPTICAL TECHNOLOGY)

2/9/34 (Item 12 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

04622313 E.I. No: EIP97023520353
Title: Interdigitated microelectrode arrays based on sputtered carbon thin-films
Author: Fiaccabrino, G.C.; Tang, X.-M.; Skinner, N.; de Rooij, N.F.; Koudelka-Hep, M.
Corporate Source: Univ of Neuchatel, Neuchatel, Switz
Conference Title: Proceedings of the 1996 6th International Meeting on Chemical Sensors
Conference Location: Gaithersburgh, MD, USA Conference Date: 19960722-19960725
E.I. Conference No.: 45993
Source: Sensors and Actuators, B: Chemical v B35 n 1-3 pt 1 Sep 1996. p 247-254
Publication Year: 1996
CODEN: SABCEB
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9704W1
Abstract: Thin-film carbon microelectrodes deposited by RF sputtering onto a Si/Si//3N//4 substrate are presented. By optimizing the deposition parameters, films showing low resistivity (10** minus **3 Omega cm) and good adhesion are achieved. Physical, spectroscopic and electrochemical characterizations are carried out. The electrocatalytical properties of the carbon thin-films are assessed with and without surface activation. Successful patterning in **O // 2** **plasma** is demonstrated by the

Measuring Instruments); 932 (High Energy, Nuclear & Plasma Physics)
71 (ELECTRONICS & COMMUNICATIONS); 70 (ELECTRICAL ENGINEERING); 94 (INSTRUMENTS & MEASUREMENT); 93 (ENGINEERING PHYSICS)

2/9/36 (Item 14 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)

04215690 E.I. No: EIP95072798030
Title: Black silicon method: a universal method for determining the parameter setting of a fluorine-based reactive ion etcher in deep silicon trench etching with profile control
Author: Jansen, Henri; de Boer, Meint; Legtenberg, Rob; Elwenspoek, Miko
Corporate Source: Univ of Twente, Enschede, Neth
Conference Title: Proceedings of the 5th European Workshop on Micromechanics (MME'94)
Conference Location: Pisa, Italy Conference Date: 19940905-19940906
E.I. Conference No.: 43321
Source: Journal of Micromechanics and Microengineering v 5 n 2 Jun 1995. p 115-120
Publication Year: 1995
CODEN: JMMIEZ ISSN: 0960-1317
Language: English
Document Type: JA; (Journal Article) Treatment: A; (Applications); X; (Experimental)
Journal Announcement: 9509W4
Abstract: Very deep trenches (up to 200 mu m) with high aspect ratios (up to 10) in silicon and polymers are etched using a fluorine-based **plasma** (SF//6/ O // 2 /CHF//3). Isotropic, positively and negatively (i.e. reverse) tapered as well as fully vertical walls with smooth surfaces are achieved by controlling the plasma chemistry. A convenient way to find the processing conditions needed for a vertical wall is described: the black silicon method. This new procedure is checked for three different reactive ion etchers (RIE), two parallel-plate reactors and a hexode. The influence of the RF power, pressure and gas mixture on the profile will be shown. Scanning electron microscope (SEM) photos are included to demonstrate the black silicon method, the influence of the gases on the profile, and the use of this method in fabricating **microelectromechanical** systems (**MEMS**). (Author abstract) 16 Refs.
Descriptors: *Plasma etching; Silicon; Polymers; Aspect ratio; Surfaces; Reactive ion etching; Scanning electron microscopy; Fluorine; Pressure effects; Gases
Identifiers: Black silicon method; Silicon trench etching; Profile control; Plasma chemistry; Gas mixture; Hexode; Parallel plate reactors
Classification Codes:
712.1.1 (Single Element Semiconducting Materials)
714.2 (Semiconductor Devices & Integrated Circuits); 712.1 (Semiconducting Materials); 815.1 (Polymeric Materials); 943.3 (Special Purpose Instruments); 931.2 (Physical Properties of Gases, Liquids & Solids); 802.2 (Chemical Reactions)
714 (Electronic Components); 712 (Electronic & Thermionic Materials); 815 (Plastics & Polymeric Materials); 943 (Mechanical & Miscellaneous Measuring Instruments); 931 (Applied Physics); 802 (Chemical Apparatus & Plants)
71 (ELECTRONICS & COMMUNICATIONS); 81 (CHEMICAL PROCESS INDUSTRIES); 94 (INSTRUMENTS & MEASUREMENT); 93 (ENGINEERING PHYSICS); 80 (CHEMICAL ENGINEERING)

2/9/37 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

15506627 PASCAL No.: 02-0202681
Patterning of diamond microstructures by bulk and surface micromachining for MEMS **devices**

Micromachining and microfabrication **process technology VII : San Francisco CA, 22-24 October 2001**
YONGQING FU; HEJUN DU
KARAM Jean Michel, ed; YASAITIS John, ed
School of Mechanical and Production Engineering, Nanyang Technological University, Singapore, 639798, Singapore
International Society for Optical Engineering, Bellingham WA, United States
Micromachining and microfabrication process technology. Conference, 7 (San Francisco CA USA) 2001-10-22
Journal: SPIE proceedings series, 2001, 4557 24-30
ISBN: 0-8194-4285-2 ISSN: 1017-2653 Availability: INIST-21760; 354000097065580040
No. of Refs.: 22 ref.
Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)
Country of Publication: United States
Language: English

In this paper, diamond microstructures were patterned over silicon/silicon dioxide substrate using the processes combined with bulk or surface micromachining, selective growth of diamond and plasma etching technique. Polycrystalline diamond films were prepared using microwave plasma enhanced chemical vapor deposition (MW-PECVD) and a gas mixture of hydrogen and methane. Two types of techniques for precise patterning of diamond microstructures were investigated in this paper. The first one was to selectively grow diamond films in the desired region by pre-depositing a Pt interlayer on silicon dioxide layer. The second one was to selectively etch the deposited diamond film in **oxygen** /argon **plasma** under an Al mask. Different microstructures, for example, microgear, microrotor, comb drive structure, etc. were successfully fabricated.

English Descriptors: Precision engineering; **Microelectromechanical** device ; Microelectronic fabrication; Micromachining; Plasma etching; Dry process; Microstructure; Selective growth; Reactive ion etching; Substrate; Polycrystal; Silicon; Silicon oxides; Diamond; Patterning; Modeling; Experimental study

French Descriptors: Mecanique precision; Dispositif microelectromecanique; Fabrication microelectronique; Microusinage; Gravure plasma; Procede voie seche; Microstructure; Croissance selective; Gravure ionique reactive; Substrat; Polycristal; Silicium; Silicium oxyde; Diamant; Formation motif ; Modelisation; Etude experimentale; 8585; 8540X; 8115

Classification Codes: 001D03F21; 001D03F17; 001B80A15

2/9/38 (Item 2 from file: 144)
DIALOG(R)File 144:Pascal

15505627 PASCAL No.: 02-0201655
Fabrication of electromagnetic micromirror array
Micromachining and microfabrication **process technology VII : San Francisco CA, 22-24 October 2001**
JANG Yun-Ho; KIM Yong-Kweon
KARAM Jean Michel, ed; YASAITIS John, ed
School of Electrical Engineering and Computer Science, Seoul National University, 301-1116(#007), San 56-1, Shillim-dong, Kwanak-gu, Seoul 151-742, Korea, Republic of
International Society for Optical Engineering, Bellingham WA, United States
Micromachining and microfabrication process technology. Conference, 7 (San Francisco CA USA) 2001-10-22
Journal: SPIE proceedings series, 2001, 4557 395-402
ISBN: 0-8194-4285-2 ISSN: 1017-2653 Availability: INIST-21760;

354000097065580450
No. of Refs.: 7 ref.
Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)
Country of Publication: United States
Language: English

This paper describes the design, fabrication and experiments of a micromirror array driven by electromagnetic force for right angle beam reflection to the vertical direction of the substrate. The device was fabricated using aluminum surface micromachining combined with nickel electroplating. The micromirror has couple of torsional springs enough long for 45 degree rotation, which angular deflection is necessary for right angle beam reflection. Also micromirror has a magnetic material for electromagnetic operation, and it has a mechanical stopper for angular deflection control. The main structural material is evaporated aluminum, and magnetic material is electroplated nickel. Thick photoresist is used as a sacrificial layer, and it is removed by **oxygen plasma** process. Electromagnetic characteristics were measured to find that about 10kA/m magnetic field intensity is needed for 45 degrees angular deflection. 25V-50V clamping voltage is required for individual operation between the array within external magnetic field. The dynamic response measurement was fulfilled using He-Ne laser and position sensitive diode (PSD). The lapsed time to reach 45 degrees is less than 0.5ms. But upward spring bending prevents the stopper from touching the substrate, therefore some oscillations corresponding to natural response is observed.

English Descriptors: Micromachining; Miniaturization; **Microelectromechanical** device; Microelectronic fabrication; Magnetic material; Manufacturing process; Mirror; Electrodeposition; Substrate; Sacrificial layer; Photoresist; Angle of incidence; Reflection; Electromagnetism; Aluminium; Nickel; Clamping; Dynamic response; Modeling ; Experimental study

French Descriptors: Microusinage; Miniaturisation; Dispositif microelectromecanique; Fabrication microelectronique; Materiau magnetique ; Procede fabrication; Miroir; Depot electrolytique; Substrat; Couche sacrificielle; Photoresist; Angle incidence; Reflexion; Electromagnetisme ; Aluminium; Nickel; Bridage; Reponse dynamique; Modelisation; Etude experimentale; 8585; 8540X; Micromirror array

Classification Codes: 001D03F21; 001D03F17

2/9/39 (Item 3 from file: 144)
DIALOG(R)File 144:Pascal

13746984 PASCAL No.: 98-0439711
Low temperature silicon direct bonding for application in micromechanics : bonding energies for different combinations of oxides
KRAEUTER G; SCHUMACHER A; GOESELE U
Max-Planck-Institut fuer Mikrostrukturphysik, Weinberg 2, 06120 Halle/Saale, Germany
Journal: Sensors and actuators. A, Physical, 1998, 70 (3) 271-275
ISSN: 0924-4247 Availability: INIST-19425A; 354000070932070100
No. of Refs.: 12 ref.
Document Type: P (Serial) ; A (Analytic)
Country of Publication: Switzerland
Language: English

Plain or structured hydrophillic silicon wafers covered with native oxide or with thermally grown oxide layers have been directly bonded at room temperature; afterwards, the samples were annealed at 100 Degree C to 400 Degree C. There is a significant difference in the observed bonding energy depending on the wafer pairing chosen. If one or both wafers are covered with a native oxide layer, high bonding strengths are reached even at low

temperatures. This can be explained by the different diffusion behaviour of water molecules through a thick thermal oxide layer on one hand, and through a thin native oxide layer on the other hand. Two different methods for the activation of the wafer surfaces just prior to bonding are described.

English Descriptors: Wafer bonding; Native state; Oxides; Thermalization; **Oxygen ; Plasma ; Micromechanical devices** ; Experimental study

French Descriptors: 0710C; 8165M; Fixation pastille; Etat natif; Oxyde; Thermalisation; Oxygene; Plasma; Dispositif micromecanique; Etude experimentale

Classification Codes: 001B00G10C; 001B80A65

2/9/40 (Item 4 from file: 144)

DIALOG(R)File 144:Pascal

13343797 PASCAL No.: 98-0070496

High aspect ratio etching in polymer for microactuator applications

Micromachining and microfabrication **process technology III : Austin TX, 29-30 September 1997**

LEE W Y; GAO J; HIRANO T; CHAN S; FAN L S

SHIH-CHIA CHANG, ed; PANG Stella W, ed

IBM Almaden Research Center, San Jose, CA 95120, United States

International Society for Optical Engineering, Bellingham WA, United States.

Micromachining and microfabrication process technology. Conference, 3 (Austin TX USA) 1997-09-29

Journal: SPIE proceedings series, 1997, 3223 110-117

ISBN: 0-8194-2655-5 ISSN: 1017-2653 Availability: INIST-21760; 354000077517210130

No. of Refs.: 5 ref.

Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)

Country of Publication: United States

Language: English

High aspect ratio line and trench plating molds suitable for microactuator applications were etched in polymer using **oxygen plasma** in an RF inductive plasma etcher. A high vertical etch rate of similar = 2.5 mu m/min in a polymer has been achieved for 2 mu m wide lines and trenches, with even higher rates being observed for wider trenches due to the usual RIE lag effect. The lateral etch rate can be reduced by adjusting the inductive to bias power ratio, and by lowering the etch temperatures. Under optimum etching conditions, aspect ratios of close to 20:1 in a 2.5 mu m line/2.0 mu m spacing pattern and of greater than 20:1 in isolated 2.0 mu m lines with >=5 mu m spacing have been achieved.

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s (MEMS or micromechanical or microelectromechanical) and
dry(3N)(etchant or etch or etches or etching or etched or release) and
(O(w)2 or oxygen)(3n)plasma

          Items   File
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              5     2: INSPEC_1969-2002/Jun W2
              3     8: Ei Compendex(R)_1970-2002/Jun W2
              2    34: SciSearch(R) Cited Ref Sci_1990-2002/Jun W3
              1    35: Dissertation Abs Online_1861-2002/May
              2    95: TEME-Technology & Management_1989-2002/Jun W2
              3   144: Pascal_1973-2002/Jun W2
       Examined  50 files

### Status: Break Sent.

?b 2,8,35,144
       13jun02 14:01:26 User264704 Session D125.4
            $4.27    2.440 DialUnits File411
     $4.27  Estimated cost File411
     $0.65  TELNET
     $4.92  Estimated cost this search
    $20.83  Estimated total session cost   5.750 DialUnits


SYSTEM:OS  - DIALOG OneSearch
  File   2:INSPEC  1969-2002/Jun W2
         (c) 2002 Institution of Electrical Engineers
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         (c) 2002 Engineering Info. Inc.
  File  35:Dissertation Abs Online  1861-2002/May
         (c) 2002 ProQuest Info&Learning
  File 144:Pascal  1973-2002/Jun W2
         (c) 2002 INIST/CNRS

      Set  Items  Description
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?s (MEMS or micromechanical or microelectromechanical) and dry(3N)(etchant or etch or e
tches or etching or etched or release) and (O(w)2 or oxygen)(3n)plasma
           9354  MEMS
          16603  MICROMECHANICAL
           8594  MICROELECTROMECHANICAL
         141254  DRY
           3657  ETCHANT
          36450  ETCH
           1109  ETCHES
         107117  ETCHING
          29913  ETCHED
         204917  RELEASE
           9231  DRY(3N)(((((ETCHANT OR ETCH) OR ETCHES) OR ETCHING) OR
                 ETCHED) OR RELEASE)
        1304080  O
        5509460  2
          32850  O(W)2
         544588  OXYGEN
         702943  PLASMA
           8168  (O(W)2 OR OXYGEN)(3N)PLASMA
      S1     12  (MEMS OR MICROMECHANICAL OR MICROELECTROMECHANICAL) AND
                 DRY(3N)(ETCHANT OR ETCH OR ETCHES OR ETCHING OR ETCHED OR
                 RELEASE) AND (O(W)2 OR OXYGEN)(3N)PLASMA
?rd
...completed examining records
      S2       9  RD (unique items)
?t s2/full/all

 2/9/1     (Item 1 from file: 2)
DIALOG(R)File   2:INSPEC
```

7034233 INSPEC Abstract Number: B2001-10-2575B-019

Title: Integration of sputtered silicon microstructures with pre-fabricated CMOS circuitry

Author(s): Horner, K.A.; Kovacs, G.T.A.
Author Affiliation: Stanford Univ., CA, USA

Journal: Sensors and Actuators A (Physical) Conference Title: Sens. Actuators A, Phys. (Switzerland) vol.A91, no.3 p.386-97
Publisher: Elsevier,
Publication Date: 15 July 2001 Country of Publication: Switzerland
CODEN: SAAPEB ISSN: 0924-4247
SICI: 0924-4247(20010715)A91:3L.386:ISSM;1-L
Material Identity Number: N866-2001-010
U.S. Copyright Clearance Center Code: 0924-4247/2001/$20.00
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Document Number: S0924-4247(01)00612-4
Language: English Document Type: Conference Paper (PA); Journal Paper (JP)
Treatment: Practical (P); Experimental (X)

Abstract: This paper describes a novel fabrication process for creating sputtered silicon microstructure similar to those commonly made using LPCVD polysilicon. Unlike the LPCVD polysilicon processes, however, this low-temperature sputtered process is compatible with pre-fabricated aluminum-metallized CMOS circuitry. Both polyimide and conventional oxide sacrificial layers were used, with the former being removed using **oxygen plasma** . This **dry - release** step eliminated the need for critical point drying commonly required for wet releases. To evaluate sputtered silicon for use in **MEMS** , several properties were investigated, including in-plane stress, strain gradient, density, surface roughness, electrical resistivity, and HF permeability. Tensile stress values lower than 100 MPa were achieved by varying the deposition parameters. Average strain gradients were an inverse square function of thickness. Densities were slightly lower than bulk silicon values. Surface roughness was less than 6 nm rms. The electrical conductivity of the silicon bare films was low but was increased by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. Finally, to demonstrate the technology, an electrostatically deflected plate structure was fabricated above a capacitance measurement circuit and performance results are presented. (27 Refs)

Subfile: B
Descriptors: capacitive sensors; CMOS integrated circuits; density; electrical resistivity; elemental semiconductors; internal stresses; **micromechanical** devices; microsensors; semiconductor thin films; silicon; sputter deposition; sputter etching; surface topography
Identifiers: sputtered silicon microstructures; pre-fabricated CMOS circuitry; low-temperature sputtered process; Al-metallized CMOS circuitry; polyimide sacrificial layers; oxide sacrificial layers; **oxygen plasma** ; **dry - release** step; **MEMS** ; in-plane stress; strain gradient; density; surface roughness; electrical resistivity; HF permeability; tensile stress; deposition parameters; electrical conductivity; silicon bare films; cladding; CMOS transistors; maximum saturation current; mechanical layer processing; electrostatically deflected plate structure; capacitance measurement circuit; Si-SiO/sub 2/; TiW
Class Codes: B2575B (Materials for micromechanical device technology); B2575F (Fabrication of micromechanical devices); B0520B (Sputter deposition); B2570D (CMOS integrated circuits); B2550E (Surface treatment (semiconductor technology)); B7230M (Microsensors)
Chemical Indexing:
Si-SiO2 int - SiO2 int - O2 int - Si int - O int - SiO2 bin - O2 bin - Si bin - O bin - Si el (Elements - 1,2,2)

TiW int - Ti int - W int - TiW bin - Ti bin - W bin (Elements - 2)
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2/9/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC
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6911426 INSPEC Abstract Number: B2001-06-2575B-002
Title: Sputtered silicon for integrated MEMS applications
Author(s): Honer, K.A.; Kovacs, G.T.A.
Author Affiliation: Center for Integrated Syst., Stanford Univ., CA, USA
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop (TRF Cat. No.00TRF-0001) p.308-11
Publisher: Transducers Res. Found, Cleveland, OH, USA
Publication Date: 2000 Country of Publication: USA xvi+376 pp.
ISBN: 0 9640024 3 4 Material Identity Number: XX-2000-01551
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Medium: Also available on CD-ROM in PDF format
Language: English Document Type: Conference Paper (PA)
Treatment: Applications (A); Experimental (X)
Abstract: This paper describes a new fabrication process for creating electrostatic microstructures that are compatible with prefabricated aluminum-metallized CMOS circuitry. The process uses sputtered silicon to make released microstructures similar to those commonly made using LPCVD polysilicon but does so at much lower temperatures (~350 degrees C). The low-temperature nature of sputter deposition makes it possible to use polyimide sacrificial layers that can be released in an **oxygen plasma**. This **dry - release** process eliminates the need for critical point drying or similar methods. Average strain gradients in released sputtered silicon cantilevers were found to vary with the inverse square of thickness. At a thickness of 5.0 mu m, the radius of curvature of released cantilevers was in excess of 80 mm. Improvements in the electrical conductivity of completed structures were realized by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. As a demonstration of the integratibility of the sputtered silicon process, electrostatically actuated variable-capacitors were fabricated above CMOS capacitance detection circuitry. (9 Refs)
Subfile: B
Descriptors: capacitors; electrostatic actuators; elemental semiconductors; semiconductor thin films; silicon; sputtered coatings
Identifiers: integrated **MEMS** device; fabrication; silicon microstructure; sputter deposition; **dry release** process; cantilever beam; electrical conductivity; strain gradient; radius of curvature; CMOS transistor; electrostatic actuator; variable capacitor; capacitance detection circuit; polyimide sacrificial layer; titanium-tungsten cladding; 350 C; Si; Ti-W
Class Codes: B2575B (Materials for micromechanical device technology); B2520C (Elemental semiconductors); B0520B (Sputter deposition); B5180D (Electrostatic devices); B8380M (Microactuators); B2130 (Capacitors)
Chemical Indexing:
Si el (Elements - 1)
TiW bin - Ti bin - W bin (Elements - 2)
Numerical Indexing: temperature 6.23E+02 K
Copyright 2001, IEE

2/9/3 (Item 3 from file: 2)
DIALOG(R)File 2:INSPEC
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6911411 INSPEC Abstract Number: B2001-06-2575F-018, C2001-06-3260P-015
Title: A low power/low voltage electrostatic actuator for RF MEMS applications
Author(s): Yao, J.J.; Park, S.; Anderson, R.; DeNatale, J.
Author Affiliation: Sci. Center, Rockwell Int. Corp., Thousand Oaks, CA, USA
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop (TRF Cat. No.00TRF-0001) p.246-9
Publisher: Transducers Res. Found, Cleveland, OH, USA
Publication Date: 2000 Country of Publication: USA xvi+376 pp.
ISBN: 0 9640024 3 4 Material Identity Number: XX-2000-01551
Conference Title: Technical Digest. Solid-State Sensor and Actuator Workshop
Conference Sponsor: Transducers Res. Found
Conference Date: 4-8 June 2000 Conference Location: Hilton Head Island, SC, USA
Medium: Also available on CD-ROM in PDF format
Language: English Document Type: Conference Paper (PA)
Treatment: Applications (A); Experimental (X)
Abstract: We have designed and fabricated a low power/low voltage electrostatic actuator, and demonstrated its application to a large tuning-ratio tunable capacitor for RF **MEMS** applications. Using adhesive bonding and deep silicon reactive ion etching techniques, the entire **MEMS** device is made of single crystal silicon, and is suspended over a glass substrate. A coat of aluminum is sputtered on after the **dry release** in an **oxygen plasma** to provide good electrical conductivity for the integrated RF devices. An electrostatic deflection of 23 mu m has been demonstrated with an applied voltage of 5.2 V, and has resulted in the tunable capacitor having a maximum continuous tuning ratio in excess of 4.5 to 1. Alternative devices with a required low tuning voltage of 3 V have also been demonstrated to provide a tuning ratio of 2 to 1. Power consumption of this actuator is linearly proportional to the actuation frequency, and is in the range of 10's of nano-Watts when the device is actuated at a frequency of a few kHz. (9 Refs)
Subfile: B C
Descriptors: adhesion; capacitors; electrostatic actuators; low-power electronics; sputter etching; tuning
Identifiers: electrostatic actuator; RF **MEMS** device; tuning ratio; tunable capacitor; adhesive bonding; deep reactive ion etching; low-power low-voltage operation; single crystal silicon; glass substrate; electrical conductivity; aluminum sputtered coating; 3 V; 5.2 V; Si; Al
Class Codes: B2575F (Fabrication of micromechanical devices); B8380M (Microactuators); B5180D (Electrostatic devices); B2130 (Capacitors); C3260P (Microactuators)
Chemical Indexing:
Si sur - Si el (Elements - 1)
Al el (Elements - 1)
Numerical Indexing: voltage 3.0E+00 V; voltage 5.2E+00 V

2/9/4 (Item 4 from file: 2)
DIALOG(R)File 2:INSPEC

6657031 INSPEC Abstract Number: A2000-17-4283-013, B2000-09-4145-013
Title: Design, fabrication, and experiment of micromirror with aluminum pin-joints
Author(s): Chang-Hyeon Ji; Yong-Kweon Kim
Author Affiliation: Sch. of Electr. Eng., Seoul Nat. Univ., South Korea
Conference Title: 3rd International Conference on Micro Opto Electro Mechanical Systems (Optical MEMS). MOEMS 99. Proceedings p.44-8
Publisher: Inst. Mikrotechnik, Mainz, Germany
Publication Date: 1999 Country of Publication: Germany 273 pp.
Material Identity Number: XX-2000-01236
Conference Title: Proceedings of MOEMS 99
Conference Sponsor: Controlware; CSEM; Haas Laser; IOT Integrierte Optik

Technol.; Schott; Siemens Electromech. Components; et al
Conference Date: 30 Aug.-1 Sept. 1999 Conference Location: Mainz, Germany
Language: English Document Type: Conference Paper (PA)
Treatment: Practical (P); Experimental (X)
Abstract: This paper describes the design, fabrication and experiments of surface-micromachined micromirror array with hidden pin-joints. Instead of using elastic components, such as cantilevers and torsion hinges, we used pin-joint composed of pin and staples to support the mirror plate. The position of the pin-joint structure, under the mirror plate, makes large active surface area possible. Arrays of 100*110 mu m/sup 2/ sized micromirrors with two different staple shapes are designed and fabricated. These flexureless micromirrors are driven by electrostatic force between mirror plate and address electrode. As the mirror plate has discrete deflection angles, the device is well suited for applications where digital operation of mirror device is needed. Four-level metal structural layers and semi-cured photoresist sacrificial layers are used in the fabrication process. Polymeric sacrificial layers are removed by **dry release** process using **oxygen plasma** ashing. Static characteristics of the fabricated samples are measured and analyzed. (11 Refs)
Subfile: A B
Descriptors: micro-optics; micromachining; **micromechanical** devices; mirrors; optical design techniques; optical fabrication; photoresists
Identifiers: micromirror design; micromirror fabrication; aluminum pin-joints; surface-micromachined micromirror array; hidden pin-joints; elastic components; cantilevers; torsion hinges; mirror plate; pin-joint structure; large active surface area; flexureless micromirrors; electrostatic force; address electrode; discrete deflection angles; four-level metal structural layers; photoresist sacrificial layers; fabrication process; polymeric sacrificial layers; **dry release** process; **oxygen plasma** ashing; 100 mum; 1L0 mum; Al
Class Codes: A4283 (Micro-optical devices and technology); A4215E (Optical system design); A4280A (Optical lenses and mirrors); A4285D (Optical fabrication, surface grinding); A0710C (Micromechanical devices and systems); B4145 (Micro-optical devices and technology); B2575F (Fabrication of micromechanical devices)
Chemical Indexing:
Al el (Elements - 1)
Numerical Indexing: size 1.0E-04 m; size 1.1E-04 m

2/9/5 (Item 5 from file: 2)
DIALOG(R)File 2:INSPEC

04164455 INSPEC Abstract Number: B9207-2550E-036
Title: Deep dry etching techniques as a new IC compatible tool for silicon micromachining
Author(s): Linder, C.; Tschan, T.; de Rooij, N.F.
Author Affiliation: Inst. of Microtechnol., Neuchatel Univ., Switzerland
Conference Title: TRANSDUCERS '91. 1991 International Conference on Solid-State Sensors and Actuators. Digest of Technical Papers (Cat. No.91CH2817-5) p.524-7
Publisher: IEEE, New York, NY, USA
Publication Date: 1991 Country of Publication: USA 1089 pp.
ISBN: 0 87942 585 7
U.S. Copyright Clearance Center Code: 91CH2817-5/91/0000-0524$01.00
Conference Sponsor: IEEE; Cerberus; Endress & Hauser; Ford; General Motors; Hewlett-Packard
Conference Date: 24-27 June 1991 Conference Location: San Francisco, CA, USA
Language: English Document Type: Conference Paper (PA)
Treatment: Applications (A); Practical (P)
Abstract: Deep **dry etching** of single-crystal silicon with IC-compatible masking materials for microstructure fabrication is reported. Reactive ion etching using chlorine/fluorine gases and positive photoresist

mask produces up to 30 mu m deep silicon steps with vertical sidewalls. **Plasma** etching with fluorine/ **oxygen** gas mixtures shows rather isotropic etch behavior; however, high selectivities of 20, 85, and greater than 300 for photoresist, silicon dioxide, and aluminum masks, respectively, permit etch depths of up to several hundreds of microns. Since these **dry etching** techniques are reproducible and controllable they indicate favorable features for application in silicon micromachining. Several examples are described: bipolar-compatible accelerometers where **dry etching** and KOH **etching** are combined, free-standing thin film microstructures (out of aluminum or silicon dioxide) realized by isotropic etching of the substrate, and thin silicon membranes fabricated by plasma etching. (6 Refs)

Subfile: B

Descriptors: accelerometers; elemental semiconductors; etching; integrated circuit technology; masks; **micromechanical** devices; photoresists; silicon; sputter etching

Identifiers: deep **dry etching** ; plasma etching; IC technology; C/sub 2/ClFs/SF/sub 6/; reactive ion etching; Si membranes; micromachining; microstructure fabrication; isotropic etch; bipolar-compatible accelerometers; thin film microstructures; Si; SiO/sub 2/; Al mask; F-O/sub 2/; KOH etching; SF/sub 6/-O/sub 2

Class Codes: B2550E (Surface treatment); B7230 (Sensing devices and transducers); B2570 (Semiconductor integrated circuits); B2550G (Lithography)

Chemical Indexing:

Si int - Si el (Elements - 1)

SiO2 int - O2 int - Si int - O int - SiO2 bin - O2 bin - Si bin - O bin (Elements - 2)

Al int - Al el (Elements - 1)

FO2 bin - O2 bin - F bin - O bin (Elements - 2)

KOH ss - OH ss - H ss - K ss - O ss (Elements - 3)

SF6O2 ss - F6 ss - O2 ss - F ss - O ss - S ss (Elements - 3)

2/9/6 (Item 1 from file: 8)

DIALOG(R)File 8:Ei Compendex(R)

06010064 E.I. No: EIP02086867892

Title: Integration of sputtered silicon microstructures with pre-fabricated CMOS circuitry

Author: Honer, Kenneth A.; Kovacs, Gregory T.A.

Corporate Source: CIS-218X Stanford University, Stanford, CA 94305-4075, United States

Source: Sensors and Actuators, A: Physical v 91 n 3 Jul 15 2001. p 386-397

Publication Year: 2001

CODEN: SAAPEB ISSN: 0924-4247

Language: English

Document Type: JA; (Journal Article) Treatment: X; (Experimental)

Journal Announcement: 0202W4

Abstract: This paper describes a novel fabrication process for creating sputtered silicon microstructures similar to those commonly made using LPCVD polysilicon. Unlike LPCVD polysilicon processes, however, this low-temperature sputtered process is compatible with pre-fabricated aluminum-metallized CMOS circuitry. Both polyimide and conventional oxide sacrificial layers were used, with the former being removed using **oxygen plasma** . This **dry - release** step eliminated the need for critical point drying commonly required for wet releases. To evaluate sputtered silicon for use in **MEMS** , several properties were investigated, including in-plane stress, strain gradient, density, surface roughness, electrical resistivity, and HF permeability. Tensile stress values lower than 100 MPa were achieved by varying the deposition parameters. Average strain gradients were an inverse square function of thickness. Densities were slightly lower than bulk silicon values. Surface roughness was less than 6 nm rms. The electrical conductivity of the silicon bare films was low but was increased by cladding the sputtered silicon structural layers in

symmetric, 50 nm thick layers of titanium-tungsten. Underlying CMOS transistors showed no more than a 3% increase in their maximum saturation current after mechanical layer processing. Finally, to demonstrate the technology, an electrostatically deflected plate structure was fabricated above a capacitance measurement circuit and performance results are presented. 27 Refs.

Descriptors: Polysilicon; CMOS integrated circuits; Plasmas; Stresses; Strain; Density (specific gravity); Surface roughness; Mechanical permeability; Capacitance; **Microelectromechanical** devices

Identifiers: Sputtered silicon microstructures; CMOS circuitry; **Oxygen plasma** ; Strain gradient

Classification Codes:

549.3 (Others, incl. Bismuth, Boron, Cadmium, Cobalt, Mercury, Niobium, Selenium, Silicon, Tellurium); 714.2 (Semiconductor Devices & Integrated Circuits); 932.3 (Plasma Physics); 931.2 (Physical Properties of Gases, Liquids & Solids); 701.1 (Electricity, Basic Concepts & Phenomena); 732.1 (Control Equipment)

549 (Nonferrous Metals & Alloys); 714 (Electronic Components & Tubes); 932 (High Energy Physics; Nuclear Physics; Plasma Physics); 931 (Applied Physics Generally); 701 (Electricity & Magnetism); 732 (Control Devices)

54 (METALLURGICAL ENGINEERING, METAL GROUPS); 71 (ELECTRONICS & COMMUNICATION ENGINEERING); 93 (ENGINEERING PHYSICS); 70 (ELECTRICAL ENGINEERING, GENERAL); 73 (CONTROL ENGINEERING)

2/9/7 (Item 2 from file: 8)

05225773 E.I. No: EIP99020002808

Title: Design and fabrication of micromirror array with hidden joint structures

Author: Ji, Chang-Hyeon; Kim, Yong-Kweon

Corporate Source: Seoul Natl Univ, Seoul, South Korea

Conference Title: Proceedings of the 1998 Conference on Microelectronic Structures and MEMS for Optical Processing IV

Conference Location: Santa Clara, CA, USA Conference Date: 19980921-19980922

Sponsor: SPIE

E.I. Conference No.: 49723

Source: Proceedings of SPIE - The International Society for Optical Engineering v 3513 1998. SPIE, Bellingham, WA, USA. p 71-77

Publication Year: 1998

CODEN: PSISDG ISSN: 0277-786X

Language: English

Document Type: CA; (Conference Article) Treatment: X; (Experimental)

Journal Announcement: 9904W1

Abstract: This paper describes the design and fabrication of surface-micromachined micromirror array with hidden joint structures. Instead of using elastic spring components, such as cantilevers, flexure beams, and torsion hinges, we have used joint structure composed of pin and staples to support the mirror plate. The position of the joint structure, under the mirror plate, makes large active surface area possible. Arrays of 100 multiplied by 110 mu m**2 sized micromirrors with two different staple shapes are designed and fabricated. These flexureless micromirrors are driven by electrostatic force between mirror plate and address electrode under it. As the mirror plate has discrete deflection angles the device is well suited for spatial light modulating purpose. Four-level metal structural layers and semi-cured photoresist sacrificial layers are used in the fabrication process and sacrificial layers are removed by **dry release** process using **oxygen plasma** . Performance characteristics are measured by applying voltage difference between the ground electrode, which contacts the mirror plate via support post, and an address electrode. (Author abstract) 13 Refs.

Descriptors: Mirrors; **Microelectromechanical** devices; Micromachining; Electrostatics; Light modulation; Reactive ion etching

Identifiers: Microoptoelectromechanical systems (MOEMS)

Classification Codes:
741.3 (Optical Devices & Systems); 601.1 (Mechanical Devices); 704.1 (Electric Components); 604.2 (Machining Operations); 701.1 (Electricity: Basic Concepts & Phenomena)
741 (Optics & Optical Devices); 601 (Mechanical Design); 704 (Electric Components & Equipment); 714 (Electronic Components); 604 (Metal Cutting & Machining); 701 (Electricity & Magnetism)
74 (OPTICAL TECHNOLOGY); 60 (MECHANICAL ENGINEERING); 70 (ELECTRICAL ENGINEERING); 71 (ELECTRONICS & COMMUNICATIONS)

2/9/8 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online

01812290 ORDER NO: AADAA-I3002001
Surface micromachining techniques for integrated microsystems
Author: Honer, Kenneth Allen
Degree: Ph.D.
Year: 2001
Corporate Source/Institution: Stanford University (0212)
Adviser: Gregory T. A. Kovacs
Source: VOLUME 62/01-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 492. 236 PAGES
Descriptors: ENGINEERING, MECHANICAL ; ENGINEERING, ELECTRONICS AND ELECTRICAL
Descriptor Codes: 0548; 0544
ISBN: 0-493-10862-9

On-chip integration of circuitry with **MicroElectroMechanical** Systems (**MEMS**) is vital to the performance of many types of microsensors. Unfortunately, the most common material for surface micromachining, LPCVD polysilicon, requires processing temperatures that are incompatible with pre-fabricated standard CMOS circuitry. Sputtered films, by contrast, can be deposited directly atop CMOS circuitry at room temperatures. Both sputtered aluminum and sputtered silicon were examined as structural layers for electrostatic surface-micromachined **MEMS** .

Sputtered aluminum microstructures built atop polyimide sacrificial layers warped when released in **oxygen plasma** . The **plasma** release parameters were discovered to be a dominant factor in the warping. Design and process techniques to reduce warping of electrostatic parallel plate devices were explored and evaluated. Using these techniques it was possible to build released aluminum-based variable capacitors. However, fabrication complexity increased and the techniques did not completely eliminate warping, as evidence by the inconsistent actuation voltages of the variable capacitors.

Released curvatures of sputtered silicon cantilevers depended on thickness but were more consistent than in aluminum cantilevers. A model based on surface stresses as the dominant source of the strain gradient in the films was proposed and predicted a released radius of curvature proportional to thickness squared, matching empirical results. Several properties of sputtered silicon films were investigated. Improvements in the electrical conductivity of completed structures were realized by cladding the sputtered silicon structural layers in symmetric, 50 nm thick layers of titanium-tungsten.

Sputtered silicon microstructures made using oxide sacrificial layers were wet-released in buffered HF. It was discovered that sputtered silicon was permeable to buffered HF at film thickness of up to 5 microns. Using this permeability, buried cavities were made in underlying oxide layers. Structures made using polyimide as a sacrificial layer were dry-released in **oxygen plasma** , which eliminated the need for critical point drying normally required to prevent stiction caused by capillary forces in wet **release** processes.

The **dry - release** process had negligible effect on underlying CMOS transistors. As a demonstration of the dry-released TiW-clad sputtered silicon process, electrostatically deflected plate structures with integrated capacitance measurement circuitry were fabricated. This work

represents the first application of sputtered silicon to integrated **MEMS** .

2/9/9 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal

15506627 PASCAL No.: 02-0202681

Patterning of diamond microstructures by bulk and surface micromachining for MEMS devices

Micromachining and microfabrication process technology VII : San Francisco CA, 22-24 October 2001

YONGQING FU; HEJUN DU
KARAM Jean Michel, ed; YASAITIS John, ed
School of Mechanical and Production Engineering, Nanyang Technological University, Singapore, 639798, Singapore
International Society for Optical Engineering, Bellingham WA, United States

Micromachining and microfabrication process technology. Conference, 7 (San Francisco CA USA) 2001-10-22
Journal: SPIE proceedings series, 2001, 4557 24-30
ISBN: 0-8194-4285-2 ISSN: 1017-2653 Availability: INIST-21760; 354000097065580040
No. of Refs.: 22 ref.
Document Type: P (Serial); C (Conference Proceedings) ; A (Analytic)
Country of Publication: United States
Language: English

In this paper, diamond microstructures were patterned over silicon/silicon dioxide substrate using the processes combined with bulk or surface micromachining, selective growth of diamond and plasma etching technique. Polycrystalline diamond films were prepared using microwave plasma enhanced chemical vapor deposition (MW-PECVD) and a gas mixture of hydrogen and methane. Two types of techniques for precise patterning of diamond microstructures were investigated in this paper. The first one was to selectively grow diamond films in the desired region by pre-depositing a Pt interlayer on silicon dioxide layer. The second one was to selectively etch the deposited diamond film in **oxygen** /argon **plasma** under an Al mask. Different microstructures, for example, microgear, microrotor, comb drive structure, etc. were successfully fabricated.

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SYSTEM:OS  - DIALOG OneSearch
  File 348:EUROPEAN PATENTS  1978-2002/Jun W01
         (c) 2002 European Patent Office
  File 349:PCT FULLTEXT  1983-2002/UB=20020606,UT=20020530
         (c) 2002 WIPO/Univentio
  File 654:US PAT.FULL.  1976-2002/Jun 11
         (c) FORMAT ONLY 2002 THE DIALOG CORP.
*File 654: is redesigned with new search and display features.  See
 HELP NEWS654 for details. Reassignments current through Dec. 12, 2001.

      Set  Items  Description
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?s (MEMS or micromechanical or microelectromechanical) and dry(3N)(etchant or etch or e
tches or etching or etched or release) and (barrel(w)etch?)
           2892  MEMS
           2819  MICROMECHANICAL
           1543  MICROELECTROMECHANICAL
         526563  DRY
          25150  ETCHANT
          65889  ETCH
          11920  ETCHES
         155319  ETCHING
         115250  ETCHED
         565044  RELEASE
          26627  DRY(3N)(((((ETCHANT OR ETCH) OR ETCHES) OR ETCHING) OR
                 ETCHED) OR RELEASE)
          83581  BARREL
         195800  ETCH?
            167  BARREL(W)ETCH?
      S1       9  (MEMS OR MICROMECHANICAL OR MICROELECTROMECHANICAL) AND
                 DRY(3N)(ETCHANT OR ETCH OR ETCHES OR ETCHING OR ETCHED OR
                 RELEASE) AND (BARREL(W)ETCH?)
?rd
>>>Duplicate detection is not supported for File 348.
>>>Duplicate detection is not supported for File 349.
>>>Duplicate detection is not supported for File 654.
>>>All specified files are unsupported, command ignored.
?t s1/3/all

 1/3/1     (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS
(c) 2002 European Patent Office. All rts. reserv.

00893620
A wafer chuck for inducing an electrical bias across wafer heterojunctions
Scheibenhalter zur Induktion einer elektrischen Vorspannung uber
    Heteroubergange von Scheiben
Mandrin pour maintenir une plaquette pour l'induction d'une polarisation
    electrique en travers d'une heterojonction d'une plaquette
PATENT ASSIGNEE:
  XEROX CORPORATION, (219783), Xerox Square, Rochester, New York 14644,
    (US), (applicant designated states: DE;FR;GB)
INVENTOR:
  Peeters, Eric, 900 High School Way No. 2204, Mountain View, California
    94041, (US)
  Kubby, Joel A., 63 Spring Valley Drive, Rochester, NY 14622, (US)
LEGAL REPRESENTATIVE:
  Grunecker, Kinkeldey,  Stockmair & Schwanhausser Anwaltssozietat (100721)
    , Maximilianstrasse 58, 80538 Munchen, (DE)
PATENT (CC, No, Kind, Date):  EP 817256  A1  980107 (Basic)
APPLICATION (CC, No, Date):   EP 97304432 970624;
PRIORITY (CC, No, Date): US 670042 960625
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: H01L-021/68
ABSTRACT WORD COUNT: 152

LANGUAGE (Publication,Procedural,Application): English; English; English
```

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	9802	407
SPEC A	(English)	9802	4271
Total word count - document A			4678
Total word count - document B			0
Total word count - documents A + B			4678

1/3/2 (Item 2 from file: 348)

DIALOG(R)File 348:EUROPEAN PATENTS
(c) 2002 European Patent Office. All rts. reserv.

00893618

Dry etch **process control using electrically biased stop junctions**
Trockenatzprozesskontrolle durch elektrisch polarisierte Stopubergange
Controle de processus de l'attaque seche utilisant des jonctions d'arret polarisees electriquement

PATENT ASSIGNEE:
XEROX CORPORATION, (219783), Xerox Square, Rochester, New York 14644, (US), (applicant designated states: DE;FR;GB)

INVENTOR:
Peeters, Eric, 900 High School Way No. 2204, Mountain View, California 94041, (US)
Kubby, Joel A., 63 Spring Valley Drive, Rochester, NY 14622, (US)

LEGAL REPRESENTATIVE:
Grunecker, Kinkeldey, Stockmair & Schwanhausser Anwaltssozietat (100721), Maximilianstrasse 58, 80538 Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 817250 A1 980107 (Basic)
APPLICATION (CC, No, Date): EP 97304430 970624;
PRIORITY (CC, No, Date): US 670117 960625
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: H01L-021/3065
ABSTRACT WORD COUNT: 139

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	9802	457
SPEC A	(English)	9802	4297
Total word count - document A			4754
Total word count - document B			0
Total word count - documents A + B			4754

1/3/3 (Item 3 from file: 348)

DIALOG(R)File 348:EUROPEAN PATENTS
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00808791

Micro electromechanical RF switch
Elektromechanischer RF-Micro-Schalter
Micro-interrupteur electromecanique, pour frequences radio

PATENT ASSIGNEE:
ROCKWELL INTERNATIONAL CORPORATION, (256277), 2201 Seal Beach Boulevard, Seal Beach, California 90740-8250, (US), (Proprietor designated states: all)

INVENTOR:
Jun, Jason Yao, 3609 Lockford Court, Thousand Oaks, CA 91360, (US)

LEGAL REPRESENTATIVE:
Wachtershauser, Gunter, Prof. Dr. (12711), Patentanwalt, Tal 29, 80331 Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 751546 A2 970102 (Basic)
EP 751546 A3 970528
EP 751546 B1 000726
APPLICATION (CC, No, Date): EP 96108083 960521;
PRIORITY (CC, No, Date): US 493445 950622

DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: H01H-059/00; H01P-001/12
ABSTRACT WORD COUNT: 232
NOTE:
  Figure number on first page: 2

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	200030	383
CLAIMS B	(German)	200030	371
CLAIMS B	(French)	200030	435
SPEC B	(English)	200030	3150

Total word count - document A 0
Total word count - document B 4339
Total word count - documents A + B 4339

1/3/4 (Item 1 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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This is the appl'n

00859252 **Image available**
MANUFACTURE OF MEMS **STRUCTURES IN SEALED CAVITY USING** DRY - RELEASE MEMS **DEVICE ENCAPSULATION**
FABRICATION DE STRUCTURES DE SYSTEMES MICROELECTROMECANIQUES (MEMS **) DANS UNE CAVITE SCELLEE PAR ENCAPSULATION D'UN DISPOSITIF** MEMS **DE LIBERATION A SEC**
Patent Applicant/Assignee:
  IC MECHANICS INC, 583 Epsilon Drive, Pittsburgh, PA 15238, US, US (Residence), US (Nationality)
Inventor(s):
  CARLEY Richard L, Glen Mitchell Road, Sewickley, PA 15143, US,
Legal Representative:
  CARLETON Dennis M (agent), Buchanan Ingersoll, 20th Floor, One Oxford Centre, Pittsburgh, PA 15219, US,
Patent and Priority Information (Country, Number, Date):
  Patent: WO 200192842 A2-A3 20011206 (WO 0192842)
  Application: WO 2001US17282 20010529 (PCT/WO US0117282)
  Priority Application: US 2000583386 20000530
Designated States: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
  (EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
  (OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
  (AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
  (EA) AM AZ BY KG KZ MD RU TJ TM
Publication Language: English
Filing Language: English
Fulltext Word Count: 3476

1/3/5 (Item 1 from file: 654)
DIALOG(R)File 654:US PAT.FULL.
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4507923
Derwent Accession: 2001-396571
Utility
E/ **Trimmable singleband and tunable multiband integrated oscillator using micro-electromechanical system (** MEMS **) technology**
Inventor: Marcy, 5th, Henry O., Camarillo, CA
Pedrotti, Kenneth D., Thousand Oaks, CA
Pehlke, David R., Thousand Oaks, CA
Seabury, Charles W., Calabasas, CA
Yao, Jun J., Thousand Oaks, CA

Bartlett, James L., Cedar Rapids, IA
Chang, Mau Chung F., Thousand Oaks, CA
Mehrotra, Deepak, Thousand Oaks, CA
Tham, J. L. Julian, Irvine, CA
Assignee: Rockwell Science Center, LLC (02), Thousand Oaks, CA
Rockwell Science Center LLC (Code: 49119)
Examiner: Kinkead, Arnold (Art Unit: 287)
Law Firm: Koppel & Jacobs

	Publication Number	Kind	Date	Application Number	Filing Date
Main Patent	US 6232847	A	20010515	US 9886181	19980528
CIP	US 5959516	A		US 984679	19980108
CIP	US 5994985	A		US 97985564	19971205
CIP	US 5872489	A		US 97848137	19970428
CIP	US 5880921	A		US 97848116	19970428
Priority				US 9886181	19980528
				US 984679	19980108
				US 97985564	19971205
				US 97848137	19970428
				US 97848116	19970428

1/3/6 (Item 2 from file: 654)
DIALOG(R)File 654:US PAT.FULL.

4119732 **IMAGE Available
Derwent Accession: 1999-227896
Utility
E/ **Monolithically integrated switched capacitor bank using micro electro mechanical system (MEMS) technology**
Inventor: Tham, J.L. Julian, Irvine, CA
Bartlett, James L., Cedar Rapids, IA
Chang, Mau Chung F., Thousand Oaks, CA
Marcy, 5th, Henry O., Camarillo, CA
Mehrotra, Deepak, Thousand Oaks, CA
Pedrotti, Kenneth D., Thousand Oaks, CA
Pehlke, David R., Thousand Oaks, CA
Seabury, Charles W., Calabasas, CA
Yao, Jun J., Thousand Oaks, CA
Assignee: Rockwell Science Center, LLC (02), Thousand Oaks, CA
Rockwell Science Center LLC (Code: 49119)
Examiner: Elms, Richard T. (Art Unit: 286)
Assistant Examiner: Huynh, Kim
Law Firm: Koppel & Jacobs

	Publication Number	Kind	Date	Application Number	Filing Date
Main Patent	US 5880921	A	19990309	US 97848116	19970428
Priority				US 97848116	19970428

1/3/7 (Item 3 from file: 654)
DIALOG(R)File 654:US PAT.FULL.

4103442 **IMAGE Available
Derwent Accession: 1998-055474
Utility
C/ **Wafer chuck for inducing an electrical bias across wafer heterojunctions**
Inventor: Peeters, Eric, Mountain View, CA
Kubby, Joel A., Rochester, NY
Assignee: Xerox Corporation (02), Stamford, CT
Xerox Corp (Code: 93448)

Examiner: Knode, Marian C. (Art Unit: 163)
Assistant Examiner: Brumback, Brenda G.
Combined Principal Attorneys: Burtzlaff, Robert A.

	Publication Number	Kind	Date	Application Number	Filing Date
Main Patent	US 5865938	A	19990202	US 96670042	19960625
Priority				US 96670042	19960625

1/3/8 (Item 4 from file: 654)
DIALOG(R)File 654:US PAT.FULL.

3852636 **IMAGE Available
Derwent Accession: 1997-318992
Utility
C/ Dry etch **process control using electrically biased stop junctions**
Inventor: Peeters, Eric, Mountain View, CA
Kubby, Joel A., Rochester, NY
Assignee: Xerox Corporation (02), Stamford, CT
Xerox Corp (Code: 93448)
Examiner: Kunemund, Robert (Art Unit: 119)
Assistant Examiner: Stein, Julie E.
Combined Principal Attorneys: Burtzlaff, Robert A.

	Publication Number	Kind	Date	Application Number	Filing Date
Main Patent	US 5637189	A	19970610	US 96670117	19960625
Priority				US 96670117	19960625

1/3/9 (Item 5 from file: 654)
DIALOG(R)File 654:US PAT.FULL.

3790918 **IMAGE Available
Derwent Accession: 1997-107128
Utility
E/ **Micro electromechanical RF switch**
Inventor: Yao, Jun J., Thousand Oaks, CA
Assignee: Rockwell International Corporation (02), Seal Beach, CA
Rockwell International Corp (Code: 60643)
Examiner: Gensler, Paul (Art Unit: 252)
Combined Principal Attorneys: McFarren, John C.

	Publication Number	Kind	Date	Application Number	Filing Date
Main Patent	US 5578976	A	19961126	US 95493445	19950622
Priority				US 95493445	19950622

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      Set  Items  Description
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?s (MEMS or micromechanical or microelectromechanical) and dry(3N)(etchant or etch or e
tches or etching or etched) and sealed
           4693  MEMS
          10281  MICROMECHANICAL
           1913  MICROELECTROMECHANICAL
          91272  DRY
           7025  ETCHANT
          30054  ETCH
           1779  ETCHES
          89112  ETCHING
          32212  ETCHED
           7812  DRY(3N)((((ETCHANT OR ETCH) OR ETCHES) OR ETCHING) OR
                 ETCHED)
         104670  SEALED
      S1      2  (MEMS OR MICROMECHANICAL OR MICROELECTROMECHANICAL) AND
                 DRY(3N)(ETCHANT OR ETCH OR ETCHES OR ETCHING OR ETCHED)
                 AND SEALED
?t s1/full/1
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1/3/2 (Item 1 from file: 340)
DIALOG(R)File 340:CLAIMS(R)/US Patent

10024701 2001-0024711 2001-0006476
C/ MICROMECHANICAL **COMPONENT WITH** SEALED **MEMBRANE OPENINGS AND METHOD OF FABRICATING A** MICROMECHANICAL **COMPONENT**
Inventors: Kolb Stefan (DE); Werner Wolfgang (DE)
Assignee: Unassigned Or Assigned To Individual
Assignee Code: 68000

	Kind	Publication Number	Date	Application Number	Date
	A1	US 20010024711	20010927	US 2001794663	20010227
Continuation of:				WO 99DE2625	19990820
Priority Applic:				DE 19839124	19980827

1/9/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

6912477 INSPEC Abstract Number: B2001-06-8380M-011, C2001-06-3260P-019

Title: Flexible parylene actuator for micro adaptive flow control

Author(s): Pornsin-Sirirak, T.N.; Tai, Y.C.; Nassef, H.; Ho, C.M.

Author Affiliation: Dept. of Electr. Eng., California Inst. of Technol., Pasadena, CA, USA

Conference Title: Technical Digest. MEMS 2001. 14th IEEE International Conference on Micro Electro Mechanical Systems (Cat. No.01CH37090) p. 511-14

Publisher: IEEE, Piscataway, NJ, USA

Publication Date: 2001 Country of Publication: USA xxxviii+610 pp.

ISBN: 0 7803 5998 4 Material Identity Number: XX-2001-00290

U.S. Copyright Clearance Center Code: 0 7803 5998 4/2001/$10.00

Conference Title: Technical Digest. MEMS 2001. 14th IEEE International Conference on Micro Electro Mechanical Systems

Conference Sponsor: IEEE Robotics & Autom. Soc

Conference Date: 21-25 Jan. 2001 Conference Location: Interlaken, Switzerland

Medium: Also available on CD-ROM in PDF format

Language: English Document Type: Conference Paper (PA)

Treatment: Experimental (X)

Abstract: This paper describes the first flexible parylene electrostatic actuator valves intended for micro adaptive flow control for the future use on the wings of micro-air-vehicle (MAV). The actuator diaphragm is made of two layers of parylene membranes with offset vent holes. Without electrostatic actuation, air can move freely from one side of the skin to the other side through the vent holes. With actuation, these vent holes are **sealed** and the airflow is controlled. The membrane behaves as a complete diaphragm. We have successfully demonstrated this function using a 2-mm*2-mm parylene diaphragm electrostatic actuator valves. This work also includes the novel anti-stiction technology that is crucial to make such large-area parylene actuator diaphragm with the combined use of anti-stiction posts, self-assembled monolayers (SAM), surface roughening, and bromine trifluoride (BrF/sub 3/) **dry etching** . With the help of SAM treatment, the operating voltage is lowered from 30 volts to 13 volts. The load deflection method is then used to measure the effective thickness of the composite diaphragm. The flexible parylene diaphragm can be deflected up to 100 mu m when 150 Torr of pressure is applied. The result is fitted into a theoretical model and yields an effective thickness of 5.9 mu m, which is agreeable with the actual thickness of 5.6 mu m, thus proves the functionality of the device. (7 Refs)